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# The Canadian Medical Association Journal

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No. 2

## INDICATIONS FOR SURGERY IN PULMONARY TUBERCULOSIS\*

By ROSS ROBERTSON, M.D., F.R.C.S.(C.)

*Muskoka Hospital, Ont.*

EARLIER diagnosis and improved surgical technique have increased the frequency of the indication for surgery in pulmonary tuberculosis to a surprising extent. At the present time, in the Muskoka Hospital, 53.2 per cent of the patients who have been in residence for over a year have had one or more surgical operations. The operations are most frequently designed to provide collapse therapy after the physician has failed to obtain an efficient collapse by pneumothorax. Exceptionally, phrenic paralysis may be preferred to pneumothorax in the treatment of minimal disease. In addition, surgery is indicated in the treatment of the complications of pulmonary tuberculosis, such as, pulmonary haemorrhage, tuberculous bronchitis, tuberculous empyema, and bronchopleural fistula. Bronchoscopy is often of great value, particularly in the diagnosis of tuberculous bronchitis.

Collapse therapy is indicated for tuberculous cavities or areas of caseation. It is not so effectual for acute exudative tuberculosis, and is accompanied here by more frequent complications. It is effective because it relaxes and rests the tuberculous lung. Cavity walls are approximated; fibrous tissue, replacing destroyed lung tissue, is allowed to contract, healing or walling off the disease. The discharge of tubercle bacilli into the bronchi then ceases, rendering the sputum negative and preventing bronchogenic spread. The necessity for the addition of collapse therapy to bed rest, is strikingly illustrated in the following tables.

TABLE I.  
REST THERAPY ONLY  
(Barnes and Barnes<sup>2</sup>)

616 patients with cavities seen by x-ray.  
79 per cent dead three years after diagnosis.

COLLAPSE THERAPY  
(Robert Janes<sup>6</sup>)

144 patients with cavities demonstrated by x-ray.  
When observed two years or more after thoracoplasty  
75 per cent working full or part time.  
10 per cent improved.  
2 per cent unimproved or worse.  
10 per cent dead.  
2 per cent untraced.

It might be argued with fairness that the patients selected as suitable for thoracoplasty in Table I were a selected group with a better prognosis, whatever the treatment. A report by Friedlander and Wolpaw<sup>4</sup> provides a comparison of results in similar types of patients. Thoracoplasty was recommended in 143 patients, but operation was refused by 58. An analysis of these cases three years later gave the following results (see Table II).

TABLE II.  
ANALYSIS THREE YEARS AFTER THORACOPLASTY  
RECOMMENDED  
(Friedlander and Wolpaw<sup>4</sup>)

	85 patients who accepted operation percentage	58 patients who refused operation percentage
Cavities closed .....	57	10
Worse .....	7	35
Died .....	14	26

The value of collapse therapy in minimal pulmonary tuberculosis is shown by the report of Turner and Collins (see Table III).

\* Presented at the Seventy-first Annual Meeting of the Canadian Medical Association, Section of Surgery, Toronto, on June 19, 1940.

TABLE III.  
139 PATIENTS WITH MINIMAL TUBERCULOSIS ADMITTED  
TO SANATORIUM FROM 1930 TO 1935  
RESULTS WHEN REVIEWED IN DECEMBER, 1936  
(Turner and Collins)

40 who received pneumothorax	75 rest controls
100 per cent well.	50.6 per cent well.
	26.6 per cent active disease.
	5.3 per cent dead.
	17.3 per cent untraced.

The most favourable time to apply surgical collapse therapy is shortly after the acute exudative phase of the disease has subsided and when there is x-ray evidence of attempted healing by fibrosis.

The operations commonly used are, in order of their severity, thoracoplasties of various types, extrapleural pneumonolysis, intrapleural pneumonolysis, and phrenic paralysis. For the individual patient the operation is chosen that will give a complete collapse of the diseased area of lung with a minimum of interference with normal lung tissue. The ideal collapse is one that is complete, selective, and permanent. Thoracoplasty is the nearest approach to this ideal. However, many patients are too ill to withstand thoracoplasty, when one of the less radical and more revocable operations may be chosen.

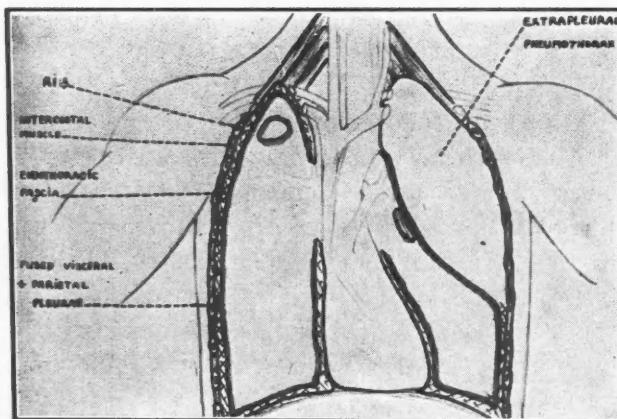


Fig. 1.—Extrapleural pneumothorax.

In the succeeding paragraphs I shall describe briefly the various types of operations and show their application in particular cases.

#### PHRENIC PARALYSIS

The indications for phrenic paralysis may be conveniently listed as follows: obliterating pneumothorax or when pneumothorax is being discontinued; cavities at the base or hilus of the lung; as an adjunct to pneumothorax; as a preliminary to thoracoplasty, etc.; haemoptysis; pain

or cough from diaphragmatic adhesions; minimal disease at the apex.

Phrenic paralysis must always be temporary when used as a preliminary to thoracoplasty, and then must be used with caution. It has been found by Janes and Thompson that patients who have a paralyzed diaphragm are more likely to develop atelectasis of the lower lobe as a post-operative complication. The diaphragm may be paralyzed to obtain further collapse after thoracoplasty.

At the first operation, the phrenic nerve is usually merely crushed, causing a paralysis of the diaphragm lasting for about six months. However, if the results of phrenic paralysis are notably successful the nerve may be avulsed at a subsequent operation and a permanent paralysis obtained.

#### CASE 1

This patient had had advanced pulmonary tuberculosis since 1931, with a large cavity in the hilus of the right lung, widespread infiltration throughout both lungs, and positive sputum. The right phrenic nerve was crushed, following which the cavity closed and the sputum became negative. Since the results of the temporary paralysis were so good it was decided to make the paralysis permanent, and phrenic avulsion was done a few months later (Fig. 2). The sputum has remained negative. Her general health is much improved.

#### CASE 2

This patient had a pneumothorax on the right side which was rapidly obliterating. Since the right lung did not appear to be entirely healed the right phrenic nerve was crushed, in order to provide additional relaxation (Fig. 3).

#### INTRAPLEURAL PNEUMONOLYSIS

A great many patients receiving artificial pneumothorax have a collapse which is rendered inefficient because of the presence of adhesions between the diseased lobe and the parietal pleura. These adhesions frequently can be divided safely by an electric cautery inserted through a cannula, and manipulated under vision through a lighted thoracoscope passed through a second cannula. If the adhesions can be completely divided so as to relax the diseased area of lung a satisfactory collapse is produced.

The indications for intrapleural pneumonolysis.—Pleural adhesions should be divided if they prevent the closure of tuberculous cavities or the relaxation of caseous areas of lung. This should be done even if the sputum is found to be negative. In the presence of a large pleural effusion which is indicative of tuberculous pleuritis intrapleural pneumonolysis is contraindicated because of the danger of the development of tuberculous empyema.



**CASE 3**

This patient had advanced pulmonary tuberculosis, with cavities in the apex of both lungs. Pneumothorax was commenced on the right side, but the right apex was held suspended by adhesions. These adhesions were then divided by intrapleural pneumonolysis and a good collapse obtained. Pneumothorax was then commenced on the left side, and the left lung was also suspended by numerous adhesions. These adhesions, in turn, were divided by intrapleural pneumonolysis, so that the patient now has an efficient, selective bilateral collapse. (See Figs. 4 and 5.) This patient is not short of breath on moderate exertion. However, it was necessary to administer oxygen while the pneumonolysis was being performed on the left side. Her sputum is negative, and clinically she is quite well.

**EXTRAPLEURAL PNEUMONOLYSIS**

When the visceral and parietal layers of pleura are adherent, rendering intrapleural pneumothorax impossible, the parietal pleura may be stripped from the chest wall and upper mediastinum by dissection in the plane of the loose areolar tissue, the so-called endothoracic fascia, as illustrated in Fig. 1.

The endothoracic fascia is approached through an incision along the fourth rib, posteriorly. A section of the fourth rib, measuring 10 to 12 cm., is resected subperiosteally from the angle outwards. The endothoracic fascia is encountered immediately after incising the deep layer of the periosteum of the rib. The parietal pleura is stripped off the chest wall with a sponge on forceps. The space thus formed is retained by refills of air, producing an extrapleural pneumothorax (see Fig. 1).

When thoracoplasty is contraindicated because of extensive or acute disease in the opposite lung, or when the patient has a low respiratory reserve, extrapleural pneumothorax may be indicated. In suitable cases thoracoplasty is a much safer operation, having fewer complications.

Extrapleural pneumonolysis is contraindicated in the presence of a large superficial cavity, or when the parietal pleura is firmly bound to the chest wall by inflammatory tissue. The latter complication can only be determined at operation. When the separation of the parietal pleura is difficult or diseased tissue is encountered the operation should be discontinued without hesitation.

**CASE 4**

This patient, who had been receiving pneumothorax on the left side for five years, returned to hospital with serious extension of her disease in the right upper lobe. Pneumothorax was attempted on the right side, but a space could not be obtained. It was felt that thoracoplasty was out of the question because of the patient's low respiratory reserve, the left lung being almost completely collapsed. An extrapleural pneumothorax was produced on the right. (See Fig. 6.) Her sputum has been rendered negative and she is not short of breath on moderate exertion.

**CASE 5**

This patient was admitted with pulmonary tuberculosis of ten years' duration. Small cavities were seen in the apex of both lungs. Pneumothorax was initiated on the left side, and was followed by an intrapleural pneumonolysis for the division of apical adhesions. A good collapse was obtained on the left. Pneumothorax was then attempted on the right side, but without success. An extrapleural pneumothorax was produced on the right securing a good selective collapse. (See Fig. 7.) Her sputum has been rendered negative.

**PLOMBAGE**

If an extrapleural pneumothorax is efficient but is so small that it is difficult to give refills of air the space may be preserved by filling it with wax through a small incision. We believe that the thick lining which forms in an extrapleural pneumothorax space will prevent the complications which are so common when plombage is used immediately after pneumonolysis.

**CASE 6**

This patient had an extrapleural pneumothorax produced in the spring of 1938. Her sputum was rendered negative, and there was considerable clearing in the left apex. The pneumothorax space was gradually becoming smaller and it was rather difficult to give her refills (Fig. 8). For this reason, the space was filled with wax in August, 1939 (Fig. 9). Her sputum has continued negative, and there have been no complications attributable to the wax.

**THORACOPLASTY**

Various types of thoracoplasty have been designed to provide a selective collapse of the tuberculous areas of lung, with as little interference as possible with normal lung tissue.

The ideal case for thoracoplasty is one that has unilateral disease of less than two years' duration, when the acute exudative phase has subsided and there is evidence of attempted healing by fibrosis. However, thoracoplasty is frequently performed on patients in whom the conditions are not ideal. If there is disease in the opposite lung which appears to be quiescent, or which can first be controlled by selective pneumothorax or an apical thoracoplasty, thoracoplasty may be carried out. If the amount of disease in the good lung is extensive, and if its control necessitates a serious reduction in the patient's respiratory reserve, a revocable form of collapse therapy, such as extrapleural pneumothorax, must be chosen. Occasionally thoracoplasty may be performed in the presence of acute exudative disease if it appears that the risk of waiting for the acute phase to subside is greater than the risk of immediate operation. This is particularly true in patients with open cavities and large quantities of bacilli-laden sputum, which may spread the disease to their

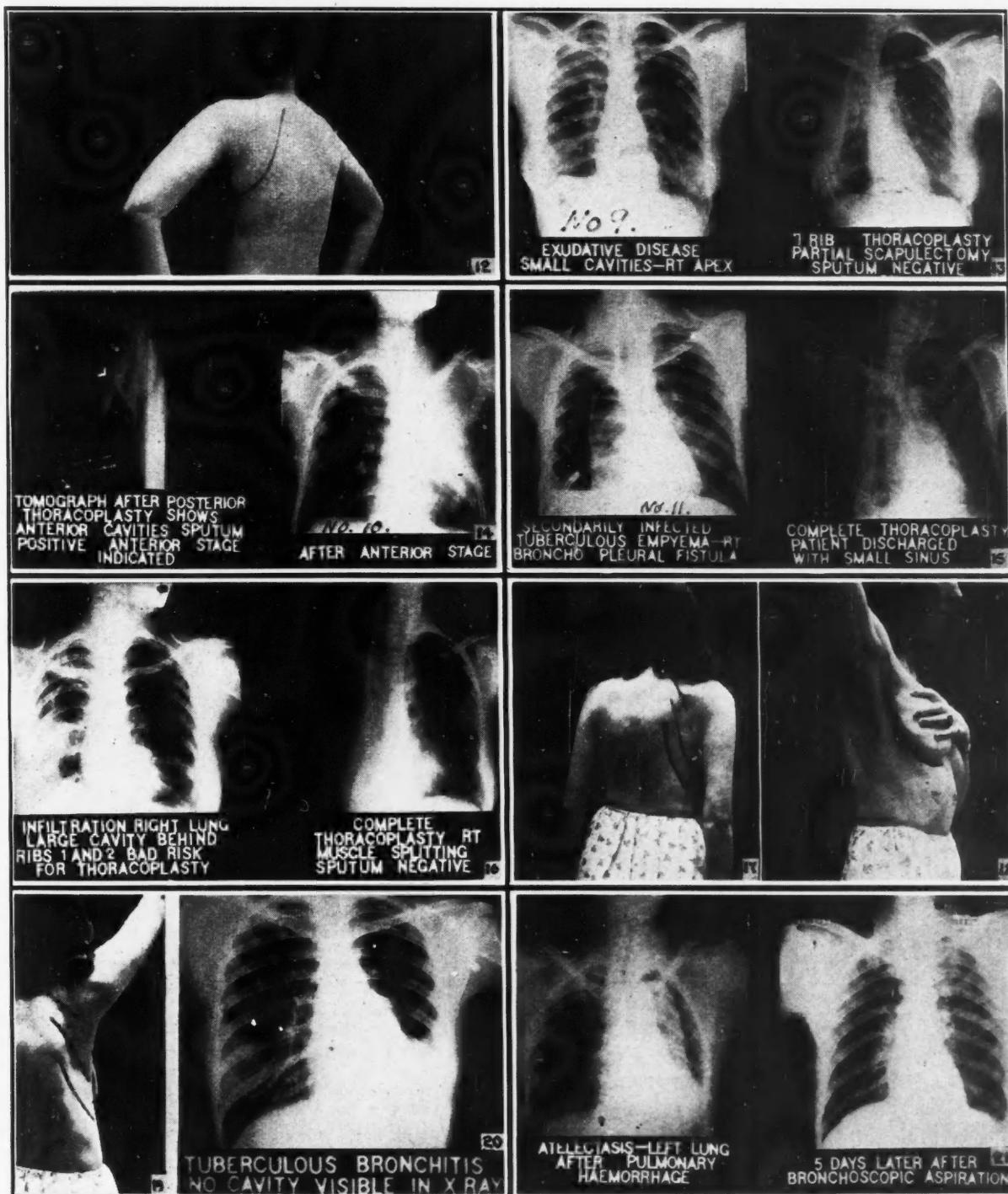
good lung. Patients selected for thoracoplasty must be fully grown or a severe deforming scoliosis of the spine will result.

The standard thoracoplasty consists in the removal of eight to ten ribs from the transverse processes to the costal cartilages of the first few ribs, grading off below. If the cavity in the lung is situated near the mid-line the transverse processes of the corresponding thoracic vertebrae are resected, to provide additional collapse. This type of thoracoplasty is used for tuberculous disease affecting most of the upper lobe. -

#### CASE 7

This patient was admitted to the Muskoka Hospital in June, 1938, with advanced pulmonary tuberculosis in the apex of the left lung. Two cavities about one inch in diameter were visible behind the first interspace and at the extreme apex on the left. The sputum was positive. The right lung was clear except for a few small calcified nodules near the hilus. Pneumothorax was attempted without success. A standard eight rib thoracoplasty was performed in three stages, the last stage on October 17, 1938 (Fig. 10). Following this she made a good recovery. The cavity in the left lung is closed, her sputum is negative, and the function of her left arm is almost normal.

Semb type thoracoplasty consists in the removal of the entire first and second ribs through



the usual thoracoplasty incision and short sections of the third and fourth ribs posteriorly. The first three intercostal bundles are then ligated and divided close to the spine. The bands of Sibson's fascia suspending the cupola of the pleura are then isolated and divided, allowing the lung to be pushed down to the level of the fifth rib posteriorly. The first two intercostal bundles are then sewn over the depressed lung to the body of the fourth thoracic vertebra. The third intercostal bundle is sewn to the fourth intercostal bundle posteriorly. When the ribs regenerate from the periosteum attached to the intercostal bundles they form a bony partition which holds the lung down to the level of the fifth rib (see Fig. 11).

This type of thoracoplasty is indicated for disease in the extreme apex of the lung, and gives an excellent selective collapse with a minimum of deformity.

#### CASE 8

This patient was admitted to hospital with a cavity 2 cm. in diameter in the apex of the left lung behind the first rib. She had a small amount of sputum positive for tubercle bacilli. The right lung was clear. A thoracoplasty with Semb's apiculysis was performed in April, 1940. It has provided a selective collapse of the diseased lung, closing the cavity and rendering the sputum negative (Fig. 11). The patient has very little deformity from the operation and the function of her left arm is almost normal (Fig. 12).

#### THORACOPLASTY AND PARTIAL SCAPULECTOMY

Consists in the removal of five to seven ribs, with resection of the lower angle of the scapula, so that the scapula can fall inward and forward without impinging on the remaining ribs.

#### CASE 9

This patient was admitted to hospital in the fall of 1939 with advanced pulmonary tuberculosis in the upper lobe of the right lung, extending down to the sixth rib posteriorly. A number of small cavities were visible in the x-ray in the right upper lobe. The left lung was clear. When the acute exudative phase of her disease had subsided clinically a seven rib thoracoplasty and partial scapulectomy was performed. The diseased right upper lobe has been efficiently collapsed, the cavities closed and her sputum rendered negative. A considerable portion of healthy lung below has been left unimpaired (Fig. 13). The function of the right shoulder is good.

#### ANTERIOR THORACOPLASTY

The anterior stage thoracoplasty consists of the excision of the first three or four costal cartilages with the remaining sections of rib. The incision is made along the anterior axillary fold curving forward over the fifth costal cartilage (see Fig. 18). The pectoralis major muscle is retracted medially and upwards, exposing the first four costal cartilages. After these have been resected, the insertion of the pectoralis

minor muscle is isolated and divided, allowing a more complete collapse of the lateral chest wall without impairing abduction of the arm.

The anterior stage of thoracoplasty is used in conjunction with the posterior stages previously discussed to close cavities which are situated anteriorly. It is also used in complete thoracoplasties for disease affecting the entire lung or for tuberculous empyemas.

#### CASE 10

Following two stages of posterior thoracoplasty with partial scapulectomy this patient continued to have a large quantity of sputum positive to tubercle bacilli. Tomograph x-rays revealed persistent cavities in the apex of the left lung behind the first two costal cartilages (Fig. 14). An anterior thoracoplasty was then performed, following which the cavities closed and his sputum diminished and became negative.

#### COMPLETE THORACOPLASTY, INCLUDING ANTERIOR STAGE

A complete thoracoplasty is indicated for disease affecting most of one lung or for tuberculous empyemas.

#### CASE 11

This patient was admitted to hospital in the summer of 1938 with secondarily infected tuberculous empyema on the right side. He occasionally coughed up small quantities of pus from his empyema, evidence of a bronchopleural fistula. As a preliminary to thoracoplasty an intercostal catheter was inserted in the fifth interspace, to ensure adequate drainage. A complete thoracoplasty was then performed in five stages (Fig. 15). The patient was discharged from hospital in December, 1939, with a small discharging sinus and negative sputum.

#### MUSCLE-SPLITTING THORACOPLASTY

This type of thoracoplasty is carried out through small muscle-splitting incisions posteriorly, combined with an anterior stage (Figs. 17, 18 and 19). The trauma of each stage is considerably less than that of the usual thoracoplasty. This type of thoracoplasty is indicated for patients who, because of the acuteness of their disease or poor general condition, are unlikely to survive the operations described above. Although the general condition may be poor, they yet have a fairly normal lung on the opposite side and considerable respiratory reserve.

#### CASE 12

This patient had far advanced tuberculous disease throughout the entire right lung. There was a large cavity near the hilus behind the first and second ribs (Fig. 16). The left lung was clear. Her sputum was positive for tubercle bacilli. She ran an evening temperature between 99 and 100°, in spite of strict bed rest. Her general condition was poor. A complete muscle splitting type of thoracoplasty, with the removal of ten ribs, was performed in four stages. At present, her cavity is closed; she has no sputum and her general health is good.

### BRONCHOSCOPY

1. Bronchoscopy is indicated for the differential diagnosis of other diseases, such as bronchogenic carcinoma and bronchiectasis.
2. Bronchoscopy is particularly useful in the diagnosis of tuberculous bronchitis, and may also be of use in its treatment.
3. Blood clots or tenacious sputum may be removed through the bronchoscope in the prevention or cure of atelectasis.

#### CASE 13

This patient had been receiving artificial pneumothorax on the left side for about three years. Her sputum continued positive for tubercle bacilli. X-ray showed a complete collapse of the left lung, which was dense and atelectatic in appearance but showed no evidence of cavity (Fig. 20). Bronchoscopy revealed a tuberculous ulceration with stenosis of the left main bronchus.

The question arises whether this patient should have a thoracoplasty. It has been our experience that thoracoplasty is of little benefit to such patients who show no x-ray evidence of cavity in the lung. They continue to have positive sputum from the tuberculous ulcers in their bronchi, even after an extensive thoracoplasty. The ulcers may be cauterized through the bronchoscope, but with indifferent success. In the future, lobectomy or pneumectomy may be the solution for such patients. If there is a cavity in the lung in addition to the ulceration of the bronchus the cavity should be closed by thoracoplasty, when it may be hoped that the ulcers will heal as the patient's condition improves.

#### CASE 14

This patient was admitted to hospital with minimal disease in the apex of the left lung. A few months after admission he had a moderate haemoptysis. Following this he suddenly became extremely short of breath and cyanosed. Physical examination revealed marked retraction of the heart and trachea to the left and dullness and diminished breath sounds over the left lung. A small pneumothorax was given on the left side to reduce the pull on the mediastinum; this gave him marked relief. Bronchoscopy was then performed and blood clots removed from the left main bronchus. Five days after bronchoscopy his left lung had almost completely re-expanded (Fig. 21).

### CONCLUSIONS

1. The most important indication for surgery in the treatment of pulmonary tuberculosis is the necessity for collapse for the closure of cavities.
2. The modern thoracoplasty operation, since it produces complete, selective and permanent collapse of the diseased area of lung, is the most efficient method available.
3. Extrapleural pneumothorax is valuable as a revocable method of collapse in patients with a low respiratory reserve, and in the presence of bilateral disease, too extensive for thoracoplasty.
4. Bronchoscopy is of great value in selecting patients for collapse therapy, since the presence of tuberculous bronchitis with ulceration or stenosis renders major collapse operations more dangerous and less likely to succeed.

5. Since the surgical treatment of pulmonary tuberculosis is designed to provide collapse therapy and does not remove the tuberculous tissues, the continuation of strict bed-rest after operation is essential.

I wish to express my appreciation of the valuable assistance and advice given by Doctor Robert Janes in the preparation of this paper, also to Doctor Harry Hazlewood, Physician-in-Chief of the Muskoka Hospital, for providing facilities which rendered its preparation possible.

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**DERMATITIS DUE TO A RUBBER SPONGE POWDER PUFF.**—The patient had an eruption involving the nose, the upper lip and the adjacent portion of the right lower eyelid. The eruption was of about four months' duration and was exceedingly itchy. The patient was instructed to stop the use of her cosmetics, soap, handkerchiefs and cleansing tissues for two weeks. At the end of that time her face was practically clear, but patch

tests for these substances were negative. Later, in obtaining samples for additional patch tests, it was learned that she had brought a rubber sponge powder puff shortly before the original onset of the eruption, and that she used the puff only when away from her home. The outline of the eruption was confined to the area of its use.—L. Hollander, *J. Am. M. Ass.*, 1940, 115: 2271.

## SOME FACTORS IN THE CAUSATION OF INTIMAL HÆMORRHAGES AND IN THE PRECIPITATION OF CORONARY THROMBI\*

By J. C. PATERSON

Ottawa

THE liberation of thromboplastic substances from lesions in the walls of arteries, particularly those affected by advanced atherosclerosis, may be taken as the immediate cause of precipitation of arterial thrombi. Other factors take part in the process, eddying and stagnation of blood at points of atherosclerotic stenosis, stasis of blood due to shock and other causes, and increased viscosity and coagulability of the blood, but without the primary injury to the arterial wall it is doubtful if thrombus formation can occur. This paper is concerned solely with the mechanism of production of intimal hæmorrhage, an injury which is admitted now to be the common precipitating cause of coronary thrombosis.

Intimal hæmorrhages have been noted repeatedly in the past at the site of precipitation of coronary thrombi, but they were considered to be the result either of rupture of the vasa vasorum due to inflammation<sup>1</sup> or of back flow of blood from the lumen into the intima through a defect produced by the rupture of an atheromatous "abscess".<sup>2</sup> The associated thrombosis in the arterial lumen was regarded, therefore, as being due either to an inflammatory process or to the contact of blood with the raw surface of an atheromatous ulcer, and not to the intimal hæmorrhage *per se*.

In a report in 1936<sup>3a</sup> and in subsequent reports,<sup>3bcefg</sup> I showed by serial sections that intimal hæmorrhages in coronary arteries are intrinsic lesions; inflammatory changes were absent in most cases, and often there was no break in the tissues lying between the hæmatoma and the lumen of the artery. The hæmorrhages were found to be due to the rupture of capillaries which are derived from the coronary lumen. This finding has been confirmed and elaborated upon by Wartman,<sup>4</sup> Winternitz and

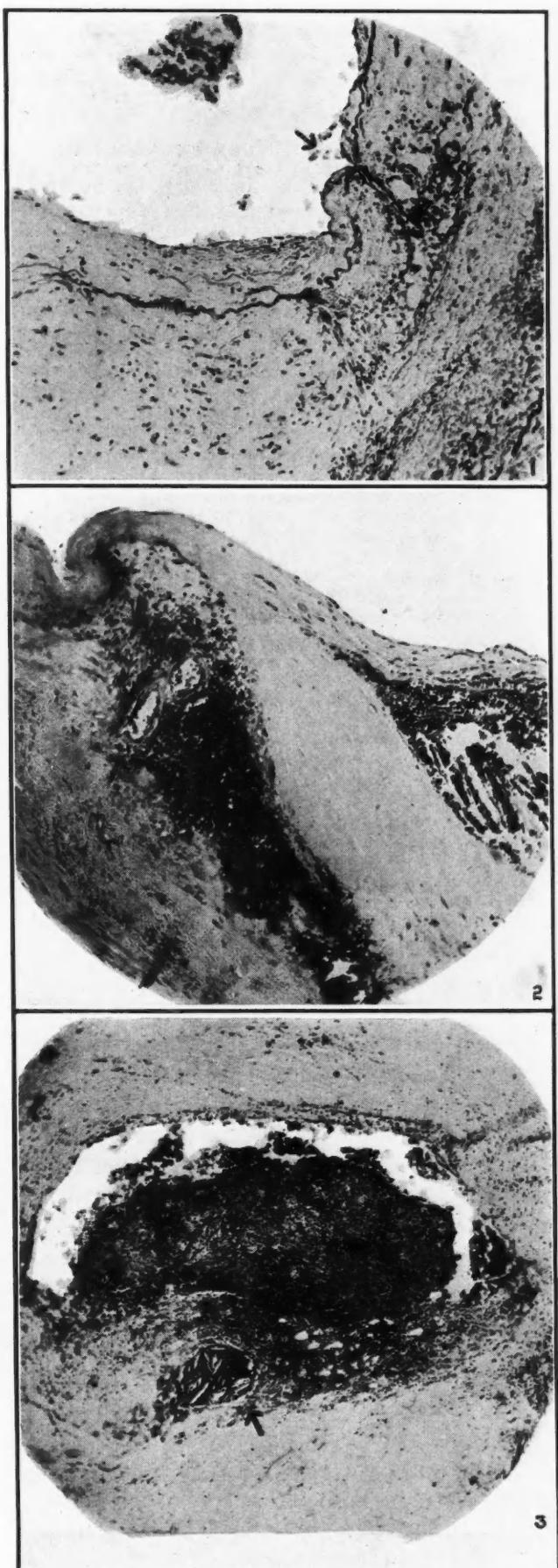
his co-workers,<sup>5</sup> and Horn and Finkelstein.<sup>6</sup> Intimal capillaries are not normal structures; they are found only in sclerotic arteries, and they develop, apparently, in response to the demand for nutrition by the plaques of atherosclerosis in which they ramify (Fig. 1). They are not related to the usual vasa vasorum although they do anastomose with these structures in some cases.

The rupture of intimal capillaries and the subsequent formation of intimal hæmorrhages (Fig. 2) is a fairly common finding in sclerotic coronary arteries; and it may lead to a variety of sequelæ, some of which are disastrous. These secondary phenomena have been discussed in detail elsewhere<sup>3bg</sup> and they may be summarized as follows. (1) Occasionally a small intimal hæmorrhage which is otherwise innocuous may irritate the medial coat and result in spasm and acute coronary insufficiency. (2) In a few cases (13 per cent in my series) the hæmorrhage attains such a size that the coronary lumen is obstructed by pressure, and sudden death from coronary insufficiency results. (3) In approximately one-third of the cases the only result is a slight increase in the size of the atherosclerotic plaque, first from the addition of blood to its bulk, and later from the presence of products of repair. (4) Finally, in about half the cases secondary thrombosis occurs in the coronary lumen<sup>3abeg</sup> (Fig. 3).

The liberation of thromboplastic substances from an intimal hæmorrhage may occur in a variety of ways. When the hæmorrhage is superficial there may be diffusion of blood and thromboplastic substances from the intima into the lumen. The rupture of the nutrient capillaries may be so extensive that necrosis of the intima results. The necrosis may actually involve the endothelium, or the pressure of blood within the lumen may rupture the thin shell of viable tissue, thus producing a defect with a raw surface. When the hæmorrhage occurs into the deeper intimal layers the capillaries adjacent to the point of rupture may thrombose; retrograde thrombosis may then take place, and,

\* From the Department of Pathology of the Ottawa Civic Hospital. Aided by a grant from the National Research Council.

This study was begun in 1935 in the Department of Pathology of the University of Toronto under the direction of the late Professor Oskar Klotz; it was continued at the Regina General Hospital in 1937, and since then at the Ottawa Civic Hospital.



when the process reaches the origin of the capillary, the thrombus may form the nucleus of an occluding mass in the lumen of the coronary artery.<sup>3b</sup>

Since 1935 fifty-eight fatal cases of coronary thrombosis have been studied by fairly exhaustive methods, including serial sections in most instances, and in 52 cases, or 89 per cent, an intimal haemorrhage has been found at the site of precipitation of the thrombus.<sup>3abeg</sup> Recently Horn and Finkelstein<sup>6</sup> have confirmed this finding in a larger series. It appears certain, therefore, that intimal haemorrhage (or other sequelae of capillary rupture) is the usual precipitating lesion in coronary thrombosis.

In the final analysis, then, the factors responsible for the rupture of intimal capillaries are the immediate causes of precipitation of most coronary thrombi. Three distinct sets of factors are involved in the process, and it is with some of these that this paper is concerned. The integrity of a capillary wall in any part of the body depends on (1) the pressure of blood within the lumen, (2) the strength and elasticity of the wall, and (3) the rigidity of the supporting tissue. I am presenting evidence here that suggests that hypertension (persistent or transient), increased capillary fragility due to avitaminosis C, and inadequate calcification of atheromatous foci are concerned in the formation of intimal haemorrhages.

#### HYPERTENSION

Intracapillary pressure appears to play an important rôle in the etiology of intimal haemorrhage and coronary thrombosis. Intimal capillaries are peculiar in that they lie in direct communication with the lumen of a large artery in which the pressure of blood, even if normal, is relatively high, approximating that in the ascending aorta. They are not, like other capillaries, at the end of a long series of arteries and arterioles which absorb much of the pressure by friction. It is reasonable to assume that the pressure in intimal capillaries of the coronary arteries will be further increased in cases of persistent hypertension or of temporary elevation of blood pressure from excessive exer-

**Fig. 1.**—Microphotograph showing a capillary (marked by arrow) arising from the lumen of a sclerotic coronary artery and penetrating the thickened intima. H. & E. X 70. **Fig. 2.**—Microphotograph of an intimal haemorrhage in a sclerotic coronary artery. The arrow points to an intimal capillary. H. & E. X 60. **Fig. 3.**—Microphotograph of a coronary thrombus adjacent to, and caused by, an intimal haemorrhage. The haemorrhage is marked by the arrow. H. & E. X 35.

cise or emotion. In these circumstances the strain on the capillary walls will be increased and there will be imminent danger of capillary dilatation and rupture.

Clinically, there is reason why this assumption is justified. Clawson<sup>7</sup> studied the autopsies and clinical data in 928 fatal cases of coronary sclerosis, and found that thrombosis was more common in patients with persistent hypertension than in those without hypertension. Master, Dack and Jaffe<sup>8</sup> studied 500 cases of coronary occlusion, and found that persistent hypertension was present in more than half of the men and in four-fifths of the women. Aring and Merritt<sup>9</sup> investigated 96 cases of cerebral thrombosis (in which the common precipitating factor is also intimal haemorrhage<sup>3</sup>), and found that in 85 per cent of the cases the systolic blood pressure was in excess of 140 mm. of mercury. On clinical grounds, therefore, it would appear that persistent hypertension is a common etiological factor in the production of coronary thrombosis, a disease which we know to be caused by intimal haemorrhage.

I have maintained for some time that if persistent hypertension can cause increased intracapillary pressure and intimal haemorrhage the same effect will be produced by the transient and sudden hypertension that results from physical exertion and emotional stress.<sup>3bcd</sup> Actually, this opinion agrees with present day medical teaching, as expressed by Blumer<sup>10</sup> in 1939—"that either emotion or unusual physical exertion may play the part of the exciting rôle in an attack of coronary thrombosis". This hypothesis is obviously of medicolegal importance, particularly in Workmen's Compensation Board cases.

A group of physicians and pathologists in New York have disagreed with this argument for a variety of reasons, most of which have been dealt with elsewhere.<sup>3df</sup> Recently, Master<sup>8</sup> has claimed that in fatal cases of coronary occlusion the incidence of intimal haemorrhage is the same in patients who have never had hypertension as in those who have had hypertension. Likewise, Horn and Finkelstein,<sup>6</sup> while admitting that sudden rises in coronary artery pressure may conceivably disrupt intimal capillaries, believe that this mechanism is not significant as one should otherwise encounter a much greater incidence of coronary occlusion in hypertensive individuals. Each of these authors admits that

intimal haemorrhage from capillary rupture is the important precipitating cause of coronary thrombosis, and the following statistical evidence, disagreeing with their findings and opinions, should therefore be of interest.

The material consisted of 186 consecutive autopsies on patients over the age of 40 years in the Department of Pathology of the Ottawa Civic Hospital from May, 1938, to September, 1940. The degree of coronary sclerosis, the existence of hypertension, and the presence of intimal haemorrhages of the coronary (or cerebral) arteries were determined in each case.

The degree of coronary sclerosis was estimated as follows: It was considered slight (+) when the intimal changes were few and scattered; as moderate (++) when the intimal surfaces were covered with many plaques but the process had produced little or no narrowing of the lumen; and as marked (+++) when there was definite narrowing of the major branches (Davis and Klainer<sup>11</sup>).

Two criteria were used for determining the existence of hypertension: (1) A history of high blood pressure in excess of 150 mm. of Hg., systolic, and 100 mm. of Hg., diastolic, and/or (2) cardiac hypertrophy in the absence of valve defects (except aortic insufficiency) or any other known cause of hypertrophy. Heart weights of 500 g. or more in males, and 450 g. or more in females were the minimum weights regarded as indicating that hypertension had existed. Hearts with weights slightly below these figures (450 to 499 g. in males and 400 to 449 g. in females) were probably also hypertensive hearts, but these have been separated from the main series when no blood pressure readings were available and have been classed as indefinite cases. These criteria are substantially those established by Clawson.<sup>7</sup>

The presence or absence of intimal hemorrhages was determined by careful examination of the coronary arteries (and cerebral arteries in some cases). When calcification was marked, the arteries were decalcified before examination. Gross lesions suggestive of intimal haemorrhages were subjected to microscopic examination in all cases, as it was found occasionally that the haemorrhages could be simulated by dilated and engorged capillaries without extravasation of blood. When coronary thrombi were present, the occluded portions of the arteries were decalcified, and sectioned serially at intervals of 300 microns; the sections were then examined for the presence of intimal haemorrhages.

The results of this study indicate clearly the effect of persistent hypertension on the production of intimal haemorrhage. When the series of 186 cases is taken as a whole it is found that intimal haemorrhages are more than five times as frequent in hypertensive (42 intimal haemorrhages in 70 cases, or 60 per cent) as in non-hypertensive persons (13 intimal haemorrhages in 116 cases, or 11 per cent). On breaking down the series into the various grades of coronary sclerosis a similar relative incidence is maintained. One hundred and seven cases of marked and moderate coronary sclerosis (the grades that have intimal capillaries) were found in the series. Forty-one out of 57 cases of hypertension with these grades of sclerosis showed intimal haemorrhages (72 per cent), while only 13 out of 50 cases of non-hypertensives with these grades of sclerosis showed in-

timal haemorrhages (26 per cent). When the comparison is confined to cases of marked coronary sclerosis alone the hypertensive group still shows a definite preponderance of intimal haemorrhages over the non-hypertensive group (82 per cent versus 59 per cent). Elimination of the cases of indefinite hypertension from the calculation has no appreciable effect.

When blood pressure readings were available in the hypertensive groups, as they were in the majority, there was a consistently higher reading in the group with intimal haemorrhages (an average of 183 mm. systolic and 103 diastolic in 28 cases) than in the group without intimal haemorrhages (an average of 169 mm. systolic and 90 mm. diastolic in 18 cases). As can be seen from the calculated standard deviations the blood pressure readings were widely scattered in both groups. In a small series like this they can be taken as indicating a trend rather than as being statistically significant.

The findings in this series suggest strongly that persistent hypertension is intimately concerned in the rupture of intimal capillaries and in the formation of intimal haemorrhages. Horn and Finkelstein<sup>6</sup> have claimed that if hypertension is a common cause of coronary occlusion there would be a greater incidence of coronary occlusion in hypertensive individuals. My series includes 70 cases of persistent hypertension; 60 per cent of these had intimal haemorrhages, the common cause of coronary occlusion, and 33 per cent had occlusive phenomena. In this short series, then, the high incidence of intimal haemorrhage and coronary occlusion in hypertensive persons is clearly demonstrated. It shows, further, that the higher the blood pressure level the greater is the incidence of intimal haemorrhage and occlusion.

This study has been concerned solely with the influence of persistent hypertension on coronary occlusion. But one can safely assume that, if persistent high blood pressure can disrupt intimal capillaries, the temporary rises in blood pressure caused by violent emotion or exercise will have a similar effect.

Interesting examples of the possible effects of transient hypertension were encountered in my series. Two elderly men were admitted to hospital with fractured skulls and with evidence of progressively increasing intracranial pressure. Their blood pressures before their accidents were said to be normal and their

hearts at autopsy were small; but their blood pressures rose to a systolic level of 240 mm. and 170 mm., respectively, shortly before death and remained at these levels for several hours. At autopsy each case showed a moderate grade of coronary sclerosis with small recent intimal haemorrhages into atherosclerotic plaques. Five additional cases have been encountered in which there was a temporary elevation of blood pressure prior to death due to intracranial injury. None of these showed intimal haemorrhages, but it is noteworthy that on the whole they showed a lesser grade of coronary sclerosis and their blood pressures did not rise to so high a level as in the two cases given above. It cannot be stated definitely that the intimal haemorrhages in the two positive cases were due to temporary hypertension from intracranial injury, but the evidence is suggestive. I believe that transient hypertension caused by excessive exertion or violent emotion will have a similar effect, and that these activities should be avoided by all patients with coronary artery disease. This belief agrees with present-day clinical opinion.

#### CAPILLARY FRAGILITY

Variation in the strength and elasticity of capillary walls also plays a part in the integrity of intimal capillaries and in the etiology of intimal haemorrhages. It would appear that capillary fragility may be increased in several ways.

Local inflammatory changes in the arterial wall, or toxic influences of a more general nature, may affect the normal ability of endothelial cells to contract and dilate. Histologically, inflammatory infiltration in regions of intimal haemorrhage is not infrequent, but it is absent in many cases and, when present, appears to be related to the disintegration of red cells and to the necrosis of tissue, and is probably secondary.

The influence of age on the elasticity of capillary walls may also be important in the causation of intimal haemorrhage. Cutter and Marquardt<sup>12</sup> have noted an increase in fragility of capillary walls in direct proportion to the age of the patient.

Increased capillary fragility from defective nutrition is another possible etiological agent, and in this regard one thinks immediately of avitaminosis C. The mode of action of vitamin

C is not known with certainty, but it would appear that the essential pathological change in scurvy is a weakening of the endothelial walls of the capillaries due to or accompanied by a reduction in the amount of intercellular cement substance.<sup>13</sup> It cannot be definitely stated that lesser degrees of avitaminosis C, short of scurvy, have a similar but slighter effect in weakening the walls of capillaries, although theoretically this is possible. If true, vitamin C deficiency should have an important place in the causation of capillary rupture with intimal haemorrhage and in the precipitation of coronary thrombi. An attempt has been made during the past seven months to determine the level of vitamin C nutrition in public ward patients, and to correlate this with clinical evidence of coronary occlusion and other diseases.

The material consisted of 455 consecutive admissions (adults) to the public medical wards of the Ottawa Civic Hospital from February 16, 1940, to September 1, 1940. On the second day of hospitalization 7 c.c. of venous blood were withdrawn fasting from each patient, and placed in a test tube with 2 drops of 20 per cent potassium oxalate and 2 drops of 2 per cent potassium cyanide. The test tube was firmly corked, shaken and sent to the laboratory where an estimation of the vitamin C content was done as soon as possible. The method used was that described by Farmer and Abt,<sup>14</sup> using titration with indophenol. The clinical diagnosis on each case was obtained at a later date. In cases of coronary thrombosis the diagnosis was made on a typical history and physical signs, plus electrocardiographic confirmation in most cases. In this study the blood plasma vitamin C concentration was used in preference to the vitamin C storage level, first, because it was more practicable, and, secondly, because it represents a measure of the immediate nutritive level of the vitamin.

A number of interesting points were noted in the series. First, a marked degree of vitamin C deficiency in public ward patients was noted—55.8 per cent of cases showed a fasting level of less than 0.5 mg. per 100 c.c. of plasma, the lowest limit of normal by most investigators.<sup>15</sup> If 0.4 mg. per cent is taken as the lowest limit of the normal,<sup>16</sup> 29.9 per cent of the series were below this level. The degree of deficiency was practically the same in young adults as in older individuals. The high incidence of inadequate vitamin C blood concentration in public ward patients is not surprising considering their financial status, but it has been shown by Croft and Snorf<sup>16</sup> that a similar degree of deficiency exists in private patients, particularly those with gastro-intestinal disturbances.

A definite seasonal variation in the blood plasma vitamin C concentration was noted in the series, 65 per cent of the cases were below

0.5 mg. per cent in February, March, April and May, while only 42 per cent of the cases were below 0.5 mg. per cent in the summer months (June, July, August). The rise in the general level of blood vitamin C concentration during the summer coincides with the influx of cheap fresh vegetables and fruit on the market.

The relation of blood plasma vitamin C concentration to disease was more difficult to evaluate. However, a striking feature in the series was the low concentrations noted in most of the patients with signs and symptoms of coronary occlusion, 81 per cent of the cases showing a concentration below 0.5 mg. per cent. This high incidence of vitamin C deficiency was not reached by any other type of disease in the series. Even gastro-intestinal diseases, including peptic ulcer, showed a higher vitamin C level on the average than did coronary occlusion, and this is surprising when one considers the effect of gastro-intestinal dysfunction on diet. Cases of indefinite coronary thrombosis and of cerebral thrombosis also showed a pronounced grade of vitamin C deficiency, although somewhat less than that in the definite coronary occlusion group.

It was interesting to compare the seasonal incidence of coronary thrombosis as established by Bean and Mills,<sup>17</sup> with the average blood plasma vitamin C concentration of public ward patients during the winter and summer months. Coronary occlusion has been established to be more frequent in the winter than in the summer, and, as has been shown here, the average blood plasma vitamin C concentration is lower in the winter than in the summer. This finding, in association with an almost constant low blood vitamin C concentration in cases of coronary occlusion, suggests a reason for the seasonal variation of the disease. The seasonal variation in coronary thrombosis may also be due in part to the fact that every period of passing cold is associated with an increase in blood pressure (W. F. Petersen).

The evidence presented here suggests that a deficient blood plasma vitamin C concentration may increase capillary fragility and thus play a part in capillary rupture, intimal haemorrhage, and precipitation of coronary thrombi. However, as Abt and Farmer<sup>18</sup> remark, the whole field of vitamin C nutrition is but in its infancy, and much more experimental and clinical evidence must be accumulated before any

definite claims are justified. At the same time there is sufficient evidence to warrant the recommendation that patients with coronary artery disease be assured of an adequate vitamin C intake either by proper diet or by the exhibition of ascorbic acid, an innocuous drug.

#### ATHEROMATOUS DEGENERATION

The third factor, the rigidity of the supporting stroma, appears to play an important part in preserving the continuity of the walls of intimal capillaries. One of the most striking observations in this series was that intimal haemorrhages had occurred almost without exception into softened plaques. It is assumed that softening, which is a physical character of atheroma, allows the pressure of blood within the capillary to dilate its walls to the extent that rupture eventually occurs. This assumption is borne out by the fact that intimal capillaries are usually of small calibre as they traverse the denser intimal layers, while they are frequently dilated in areas of atheroma. Further, the age incidence of coronary thrombosis and intimal haemorrhage corresponds roughly with that in which atheroma usually develops, *i.e.*, late middle age. Younger persons with characteristically dense and fibrous arteriosclerotic lesions and elderly persons with heavily calcified plaques are not so prone either to intimal haemorrhage or to coronary thrombosis. An interesting example of the protection afforded by calcification was seen in one of my series. In this case, the three main coronary arteries were intensely calcified; they were so hard that it was impossible to cut them with the knife or scissors without causing fragmentation of the walls of the vessels. This condition of calcification was general except for the immediate points of origin of the two main trunks and a distally placed small segment of the right coronary artery. In the latter area the wall of the vessel could be incised cleanly and with ease, and there the intimal haemorrhage and thrombus were found.

The calcification of atherosclerotic plaques appears to be but another manifestation of the general principle that any area of devitalized tissue will become infiltrated with lime salts.<sup>19</sup> The calcification of sclerotic arteries is therefore a protective phenomenon, strengthening weakened areas, and preventing gross rupture of the arterial walls and also the rupture of intimal capillaries. Theoretically, an adequate

calcium intake would appear to be indicated in all patients with coronary sclerosis. One is tempted to go farther and recommend a more rapid laying down of calcium by the exhibition of large doses of irradiated ergosterol (vitamin D). However, this procedure has no experimental backing and cannot be advised in the state of our present knowledge. Harrison<sup>20</sup> produced experimental cholesterol atherosclerosis in a series of rabbits, following which he fed them large doses of irradiated ergosterol for six months. Two distinct types of lesions were noted at autopsy; intimal atheromatous foci in which calcification was *slight* or *absent*, and medial calcification at the extreme edges of the atherosclerotic plaques.

#### SUMMARY AND CONCLUSIONS

The evidence supporting the hypothesis that the common cause of coronary thrombosis is an intimal haemorrhage is reviewed. Intimal haemorrhages are shown to result from the rupture of capillaries which are derived from the coronary lumen.

Some of the factors that are concerned in the rupture of intimal capillaries have been studied, and the results reported.

It is shown that increased intracapillary pressure, due to persistent hypertension, is a major factor in the formation of intimal haemorrhages and in the precipitation of coronary thrombi. As transient hypertension due to violent physical exertion or emotion will have a similar effect, these activities should be avoided by patients with coronary artery disease. This conclusion agrees with present day clinical opinion.

The relation of vitamin C deficiency to the incidence of coronary thrombosis has been studied, and from the available evidence it is suggested that increased capillary fragility due to inadequate blood concentration of this vitamin may be concerned in the causation of some cases of coronary thrombosis. It is therefore recommended that patients with coronary artery disease be assured of an adequate vitamin C intake.

Finally, it is suggested that the calcification of atherosclerotic plaques may protect against intimal haemorrhages and coronary thrombosis. An ample calcium intake is therefore also recommended for patients with coronary artery disease.

The statistical data reported here, particularly those concerning blood plasma vitamin C concentrations, are admittedly insufficient for any definite conclusions to be drawn; they are being presented, now, only because the further study has been postponed indefinitely.

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## THE TREATMENT OF LICHEN PLANUS WITH VITAMIN B COMPLEX\*

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**A**MONG the cutaneous reactions there is none, perhaps, more specific in its manifestations than lichen planus. Clinically, the primary lesion is a small, violaceous, polygonal papule, with a plateau-like surface which reflects the rays of light, and covered, not infrequently, with fine striae first described by Wickham. In general, the histological picture is that of a specific inflammatory eruption with a characteristic band-like infiltration of cells in the upper part of the true skin, over which there is a hyperplasia of some elements of the epidermis. In the course of its evolution we have acute and chronic manifestations. As in other diseases, and depending upon the intensity of the reactive capacity of the skin, there may be a simple erythematous-papular form of the disease, or we may see marked hypertrophic plaques of long duration. Atrophy may also supervene and few of the original primary lesions of the skin are seen. Again, the disease may be generalized, with involvement of a large part of the body surface, including the mucous membranes, or it may be localized in patches or plaques where there is a marked thickening of the integument.

It is also important to remember that sometimes a chronic thickened plaque of long standing co-exists with an acute generalized eruption of more recent onset, suggesting a dissemination from the older plaque, but this idea is not borne out by any scientific investigation. Also, we may have lichen planus which involves only the glabrous skin, or it may specifically affect the pilo-sebaceous orifices, with a resulting hyperkeratosis and a spino-follicular formation. Sometimes the distribution may take on a specific zoniform appearance, suggesting a relationship between this arrangement of lesions and the nerve distribution as controlled by a cord segment.

The etiology of lichen planus is not known. Many theories have been advanced, based chiefly on clinical observation. Parasitic, microbial, and toxic etiological factors, amongst others, have been considered, without actual proof as a result of scientific investigation. The majority of dermatologists have usually resorted to the theory of nervous causation to account for the occurrence of the eruption in many individuals. Ramel was able to determine that a violent emotional shock produced the eruption in some cases and that cure resulted only after psychoanalytical treatment. Sequeira noted, in the

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last Great War, that lichen planus seemed to increase amongst the civilian population, but could find no corresponding increase in the soldiers who engaged in the actual hostilities. On the other hand, certain observers, particularly in France, were not able to bear out this contention. The good effects obtained by lumbar puncture in some cases have been ascribed to the psychic value of this procedure. The value of irradiation of certain segments of the spinal column similarly has been construed as due to its good mental effect on these patients. On the other hand, it is well known that certain drugs are capable of calling forth an attack of lichen planus, such as the arsenicals and gold compounds, suggesting the possible presence of a biotropic reactivation of some microbial focus. It may be noted here, also, that irradiation of the spine has been known to produce an exacerbation of the eruption, perhaps also suggesting a biotropic action.

The influence of trauma in the course of an attack seems to present similarities to certain other diseases. Actual traumatization of the skin in lichen planus commonly produces linear manifestations of the disease at the height of the eruption. In psoriasis, also, there is a similar response to trauma in a certain hyperactive phase of the disease—the so-called "Kobner phenomenon". We see this, too, in eczematous people, particularly the nervous highly-strung individual who has a marked pruritus of the skin. I have observed it in the small scratch marks following protein skin tests as linear eczematized areas lasting three to four weeks, and in urticaria factitia trauma calls forth a temporary manifestation of urticaria at the site of the injury. It is probable that all these closely allied phenomena are due to a direct cellular activation in the skin, but at the same time are determined by, perhaps, abnormal stimuli from the central nervous system.

In general, the treatment of lichen planus has largely been of such a character that the nervous state of the patient as a whole, including his skin, is soothed by general and local remedies. Such treatment consists usually of rest in bed, sedatives of various kinds, and local soothing applications. Empirically, it has been found that two drugs have been of value in causing the eruption to disappear, namely, arsenic and mercury. Sometimes arsenic by mouth or by injection has been efficacious; at other times mercury in different forms has seemed equally

valuable, and, again, many cases have seemed to me to be non-responsive to either form of treatment.

For the past six months I have been interested in following a series of cases of lichen planus from the standpoint of the effect of treatment with vitamin B complex. Since the outbreak of the war, in my experience, lichen planus has been more frequent than usual. The number of cases seen in practice from September, 1939, to May, 1940, was three times that seen in the corresponding period of September, 1938, to May, 1939. There is then this idea that there exists in these people a certain psycho-neurotic background which breaks down under the stress and strain of unusual nervous tension, to reveal itself in this specific cutaneous manifestation. I have, therefore, to present to you some observations on a series of 15 cases of lichen planus which have been treated with vitamin B complex, and I hope to be able to draw certain conclusions as a result of their course and their reactions to this form of treatment.

#### CASE 1

D., female, aged 37, presented a marked generalized, very irritable, papular and confluent lichen planus of seven weeks' duration. There was a history of some domestic worry, and she was rather emotional when first seen. She had received arsenic without benefit. The irritability of the skin was intense and she was unable to sleep. In November, 1939, she was given thiamin chloride, 3,000 I.U. and 2 c.c. of liver extract intramuscularly twice a week. She showed in a few days a marked lessening of her irritability with beginning involution of the lesions. In two weeks her condition had shown a marked change and most of the lesions had begun to flatten and become pigmented. She received in all six such injections over three weeks, at the end of which time she had improved so much that they were discontinued and she was given beminal by mouth only. Some soothing applications were used locally. When seen a month later she had become markedly pigmented, her general health had improved, and there was no more need for treatment.

#### CASE 2

J.S., male, aged 46, (Figs. 1 and 2) presented marked generalized plaques on the legs, hands, forehead and buccal mucosa, which had been present for two months, associated with great irritability and a corresponding loss of sleep. I have no definite history of nervous worry in his case. He was given beminal by mouth, with liver extract 2 c.c. every second day for three injections. At the end of one week the lesions had markedly regressed and his irritability had practically gone. As he lived out of town he continued with the use of beminal and liver capsules by mouth. When seen a month later some colour remained in the lesions, which had completely flattened and no thickening could be felt. At the end of two months, on his next visit, all the lesions had disappeared, with the exception of a mild residual pigmentation.

#### CASE 3

J.M., male, aged 53, presented a markedly hypertrophic lichen planus involving the legs, of one year's duration, and in February, 1940, the eruption had be-

come generalized. He was very nervous and upset as a result of some worries over the war. In March, 1940, he was admitted to the ward, where he was given beminal, 1 drachm four times daily, and 150 mg. of nicotinic acid daily. In four days a very striking regression occurred. All the irritability had gone, the younger lesions in the body showed a marked regression, with pigmentation, and the hypertrophic lesions had begun definitely to become flattened. He continued with his treatment in hospital for three weeks, and following his discharge his general aspect and demeanour had improved considerably and he had no further irritability of the skin. He continued with his vitamin B complex and when last seen, six weeks later in the Out-patient Department, moderate thickening remained in the legs, with marked pigmentation. (The improvement here was spectacular.)



Fig. 1

Fig. 2

Fig. 3

Fig. 4

## CASE 4

R.M., male aged 42, presented a marked lichen planus in plaques on the dorsa of the feet, hands, and palms. This was apparently precipitated by arsenical medication in the course of anti-luetic treatment. A biopsy confirmed the diagnosis. He was given beminal by mouth, along with liver extract by injection. In three weeks a very marked involution had occurred, the irritability had disappeared, and little thickening was to be felt. However, some general redness remained at the site of these plaques and thiamin chloride was given by injection in conjunction with his liver extract twice weekly. When last seen, at the end of a month, there was little evidence of the disease.

## CASE 5

S.L., male, aged 59. This patient showed a marked, generalized, nodular lichen planus involving chiefly the arms and legs, of six months' standing. In November, 1939, under yeast by mouth and liver extract by injection, he showed a progressive flattening of the lesions and a moderate lessening of the irritability. He then developed an acute lymphatic leukæmia, for which he was admitted to the hospital and the treatment was discontinued. While in hospital the nodules became more irritable and no further improvement occurred. In March, 1940, he was again put on yeast and 150 mg. of nicotinic acid by mouth, which was followed by a slow, steady improvement that, however, was not rapid, but his irritability has steadily subsided since that time. There was a partial improvement in his case.

## CASE 6

S.D., female, aged 69, presented a generalized lichen planus of three months' duration. She had been given arsenic, without success, by her family physician. Under

beminal by mouth and liver extract daily by injection, and under hospital care, within three weeks the eruption had steadily regressed.

## CASE 7

W.F., female, aged 26, had discrete umbilicated papules of lichen planus on the dorsa of both hands, which had been present for six years, and there was a moderate irritability. In January, 1940, she was given beminal and liver capsules by mouth, and in six weeks the papules had entirely disappeared.

## CASE 8

P.L., male, aged 63, presented thickened, circinate plaques of lichen planus on each leg of three years' duration. There were also white patches in the buccal

mucosa. The patient was of a very highly-strung, nervous, worrisome disposition, and there was marked irritability in these patches. In February, 1940, he was given beminal and liver extract by mouth, and in one month, when seen again, the areas had become brown; little or no irritation remained and, at the same time, the lesions on the mucous membrane began to assume a normal colour. It was notable that his general nervous irritability, according to his own statement, had improved considerably, and he tired less easily. A month later the lesions showed a residual pigmentation.

## CASE 9

R.O., female, aged 58, presented a marked lichen planus of the mucous membrane of the mouth, which had been present for two years, and for which she had received some x-ray treatment without much change. She was given fresh brewers' yeast and 150 mg. of nicotinic acid by mouth, and in one month the white patches in the mouth had largely disappeared and some slight erythema remained. She continued to improve over the next month. However, after three months of vitamin B complex therapy, some slight roughness still persisted. She had been very nervous, and it was noteworthy that she had gained in weight to a considerable extent and her general health had greatly improved.

## CASE 10

J.A., male, aged 58, presented a marked characteristic lichen planus of the buccal mucosa and of the tongue, which had been present for about four months. It was associated with a sense of burning and pain. To me the subjective symptoms were far out of proportion to the general run of such cases. He had a very marked mother-complex and the condition started at the time of her death in November, 1939. Other factors present in

this man were domestic upsets and a certain definite lack of confidence in his ability. He was highly intelligent but had a marked inferiority complex. Under liver extract by injection, yeast, beminal, riboflavin, nicotinic acid and thiamin chloride, along with complete relaxation in the hospital, he showed but temporary improvement and failed to demonstrate any real progress. A complete change of environment failed to improve his condition to any appreciable degree, and the subjective symptoms recurred at definite intervals. He had also been given a course of arsenic by injection, mercury by mouth, and x-ray treatment locally, without the slightest effect. When seen two months later the lesions on the hands and arms had increased in number and were hypertrophic. Here, I think, we were dealing with a very psycho-neurotic individual in whom these mental perturbations continued, and I think that in his case these factors were decisive and accounted for the failure of any form of treatment.

#### CASE 11

H.W., male, aged 40 (Fig. 3), showed a papular, umbilicated lichen planus on the dorsa of both hands which had been present for 18 months, with marked irritability. At the onset of the war in September an accentuation of the condition occurred, because, apparently, of his fear of his inability to stand up under army conditions. In September, 1939, he was given a course of bismuth by injection, with some flattening of the lesions, but new lesions continued to develop in this area. In January, 1940, he was given thiamin chloride and liver extract by injection twice weekly for eight weeks, with partial improvement. In March, 1940, he was then given yeast by mouth, along with 150 mg. of nicotinic acid daily, and in three weeks a very marked improvement occurred. One month later he presented only a few residual lesions, which, however, have not entirely disappeared.

#### CASE 12

C., female, aged 49, in September, 1939, in the course of antiluetic therapy, developed marked generalized lichen planus. When seen in February, 1940, for the first time she showed marked residual pigmentation, chiefly in the axillæ, and also a large number of violaceous flat-topped papules along the sides of the chest and abdomen. At this time she was given fresh brewers' yeast, with thiamin chloride by injection twice weekly. In one month the papules had entirely disappeared, but apparently there was little effect upon the residual pigmentation.

#### CASE 13

A.C., female, aged 47, presented an acute, very irritable, hypertrophic lichen planus of the arms, hands, ankles, legs and thighs, which had been present for two months. She was first seen in March, 1940, having had a course of arsenic by injection without effect. Under liver extract and thiamin chloride by injection, in two weeks she made a very marked improvement, but rapidly relapsed in the following week, when an intensification of the eruption, both subjectively and objectively, occurred. It is noteworthy here that her emotional balance was greatly upset due to the fact that one of her sons had already left for England in the army, and another son had joined the naval forces. She was admitted to hospital, and under vitamin B complex and the relaxation of hospital rest she made a progressive improvement, but her final cure is still in abeyance.

#### CASE 14

N.S., male, aged 79, presented a lichen planus of the dorsa of the hands of two months' duration, with a moderate irritability. The onset of this eruption coincided with a heart attack, which he frankly admitted had worried him considerably. However, under vitamin B complex little change in the eruption can be recorded and following this x-ray treatment was given, up to the limit of tolerance, also without any appreciable improvement.

#### CASE 15

L.C., male, aged 42, (Fig. 4) showed a patchy hypertrophic lichen planus of the inner aspect of the right knee, of four years' duration. In August, 1939, improvement occurred under x-ray treatment. In November, 1939, due to continued irritability, he was given beminal by mouth and liver extract by injection twice weekly. In two months the thickening disappeared and the irritability had markedly decreased, and an atrophic appearance presented itself, with still some residual redness of the lesions. Nicotinic acid was then added to his therapy, with a further progressive improvement, but without, however, the patches becoming entirely clear.

#### COMMENT

A study of the cases here tabulated seems to bear out the view long held that there is an important relationship between dermatological and neurological reactions in this disease. There would seem to be a psycho-neurotic background, the breakdown of which, in consequence of mental stress and worry, leads to an outbreak of this disease, and that, therefore, worry and nervous influences of various kinds act as precipitating causes only in the presence of a definite psycho-neurosis.

In this series, in general, the response to vitamin B complex in the acute cases has been good, exerting almost, at times, a specific effect. The response would seem to have been much slower in chronic cases with much thickening of the skin. Where the psycho-neurosis is marked, in the presence of continued mental unrest and perturbation, therapy with vitamin B complex, as with certain empirical remedies, would seem to be ineffectual.

Attempts to ascertain the possible value of individual vitamin constituents of B complex did not reveal any therapeutic specificity, and it would appear that the administration of vitamin B complex, as a whole, should be recommended as being the more efficacious in the treatment of lichen planus by this means.

I have to thank Ayerst, McKenna & Harrison for their very liberal supply of vitamin B products of their manufacture.



## THE PRESENT STATUS OF TREATMENT OF CORONARY ARTERY DISEASE\*

By R. S. STEVENS

*Ottawa*

THE history of our knowledge of coronary artery disease and its treatment has been characterized by much trial and error, and as we look back over the past it is not difficult to see where real progress has been made. It is not easy to put a value on contemporary opinion, and yet in order that our therapy may be most effective we should attempt to put a value on the essentials as distinguished from the current fashions.

In 1768 Wm. Heberden wrote: "But there is a disorder of the breast marked with strong and peculiar symptoms, considerable for the kind of danger belonging to it, and not extremely rare, which deserves to be mentioned more at length. The seat of it, and the sense of strangling and anxiety with which it is attended, may make it not improperly be called angina pectoris—with respect to the treatment of this complaint I have little or nothing to advance—quiet and warmth, and spirituous liquors help to restore patients who are nearly exhausted—opium at bedtime will prevent the attacks at night." Fothergill in 1776 appreciated the relation between flatulence and angina pectoris and advocated the use of peppermint to facilitate the eructation of gas. In 1817, Reid, of Ireland, recommended inhalation of oxygen, and in 1854 Stokes advocated the use of chloroform. The first real therapeutic triumph occurred in 1867 when Brunton introduced amyl nitrite. This work paved the way for further investigation of the nitrites. Balfour, in 1876, was an ardent advocate of the iodides, and in 1879, Murrell brought forth the valuable drug, nitroglycerine. In 1892 Evans employed sparteine sulphate, and in 1895 Askanazy introduced theobromine sodium salicylate (diuretin). Erythrol tetranitrate was used by Bradbury in 1897, and in 1902 theobromine was introduced by Askanazy.

Further therapeutic measures appeared in rapid succession. Chloral and ammonium bromide were introduced in 1908 by MacKenzie, cervical sympathectomy in 1916 by Joanniseo,

intravenous injection of hypertonic glucose solution by Klewitz and Kirsheim in 1922, resection of the paravertebral nerves in 1923 by Danielpoli, ablation of the thyroid gland in 1933 by Blumgart, transplantation of a pedicle flap of the pectoral muscle to the epicardium in the hope of establishing an extrinsic blood supply in 1935, by Beck.

A therapeutic program in patients with coronary artery disease might be subdivided as follows: (1) the treatment of congestive failure; (2) the relief of cardiac pain; (3) the treatment of acute coronary occlusion; (4) the approach to the patient. The time allowed this paper does not admit of any detailed discussion of this broad subject, and I propose to confine my remarks to some consideration of the drugs most commonly used and of our general approach to the patient, particularly the patient with angina pectoris.

*Morphine.*—It is interesting to note that Heberden indicated that opium would relieve nocturnal pain. Any remarks about opium derivatives, and particularly morphine, obviously refer to their use in coronary thrombosis, as the drug has little place in the treatment of angina pectoris. There is much reference in the literature to the effect that morphia in large doses is indicated. This conception arises from the belief that the pain must be entirely or almost entirely relieved. Again, it is commonly believed that these patients are tolerant to morphia since pain is an antidote to morphine poisoning. Such a generalization developed earlier with reference to the severe cases; more recently improved methods of diagnosis have made possible the recognition of the milder cases, many of which do not require morphine at all. Morphine gives relief from pain by raising the threshold at the centre and not by causing coronary dilatation. The drug, in fact, causes constriction of smooth muscle and by its vagal action constricts the coronary bed. Its value lies not only in the relief from pain but in the euphoria which it produces and in the abolition of a tendency to move about. Morphine is a powerful respiratory depressant. It produces

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vomiting, constipation, and abdominal distension. It also produces strong vagal stimulation which may be responsible for ectopic rhythms such as a dangerous ventricular tachycardia, and it may cause retention of urine as a result of stimulation of the bladder sphincter. As many of these patients are advanced in years and have prostatic hypertrophy, the possibility of too much morphine producing a prostatic complication as a result of retention and catheterization, at a time when the patient is least able to deal with it, must be kept in mind. Again, particularly in elderly patients, if large doses have been used and the pain is found to disappear sooner than expected, a profound respiratory depression may appear. We should remember that many cases of coronary thrombosis do not require morphine at all, and in those who do require it our aim should be to take the edge off the pain rather than to attempt to relieve it altogether. A quarter of a grain of morphine repeated not oftener than one-half hour until the pain has been reduced to a minimum, undoubtedly accomplishes all that larger doses do and with less risk. Under such a routine rarely more than a total of a half to three quarters of a grain will be required to control the attack.

**Digitalis.**—Many of us who gathered our early knowledge of coronary thrombosis by watching the work of Herrick, Smith, Pardee, Parkinson, and Bedford, etc., will also remember our fear of digitalis in the presence of this accident. This fear was related to the vaso-constricting effect of the drug and to, we believed, the danger of ventricular rupture resulting from the more powerful cardiac contractions. Further, the objection has been raised that digitalis increases the work of the heart and that it may produce ectopic rhythms such as ventricular tachycardia. With reference to the first of these objections, digitalis does not increase intraventricular pressure, so it cannot be any factor in rupture. The literature with reference to the vaso-constrictive effect on the coronary bed is yet inconclusive. In congestive failure digitalis produces increased cardiac work and increased cardiac output. However, in this case the increased work is due to an improved capacity for work rather than an increased demand for work, a condition which it cannot be held militates against the patient's recovery. Again, a careful watch for the ap-

pearance of premature beats will help to anticipate ectopic rhythms.

Digitalis has no place in the routine treatment of coronary thrombosis. The drug is indicated when there is evidence of right or left ventricular failure, and in the presence of certain abnormal rhythms such as auricular fibrillation, auricular flutter, and, at times, paroxysmal tachycardia. These disturbances appear in other forms of heart disease, and digitalis is indicated in their presence in coronary thrombosis as in other forms of heart disease. However, it is undoubtedly good practice to digitalize these patients more slowly than one does in congestive failure as otherwise found. A total of one dram of the tincture or six grains of whole leaves spread over the day will accomplish this purpose and without risk to the patient.

**Quinidine sulphate.**—Quinidine is used in coronary thrombosis as in other cardiac lesions in the control of premature contractions, auricular flutter, auricular fibrillation, and ventricular tachycardia. Levine has raised the question that quinidine may be useful in all cases of coronary occlusion as a prophylactic, but this view has had little support. Three to five grains three times daily will control troublesome premature beats; many a case of auricular flutter or fibrillation will subside in a day or so without medication of any sort. Large doses of 30 to even 100 grains may be necessary to control ventricular tachycardia. If there is any evidence of congestive failure, digitalis should be used rather than quinidine in the control of auricular flutter or fibrillation.

**The xanthines.**—Since Askanazy first used the xanthines in the treatment of angina pectoris these drugs have had a wide popularity, and the literature is full of their praise. The most popular of these drugs have been theobromine and theophylline and particularly theophylline with ethylenediamine or aminophyllin. The use of aminophyllin was given a fresh impetus by F. M. Smith in 1935, when he published his study indicating that large doses of aminophyllin lessen the size of the infarct after experimental coronary ligation in dogs. This work was rechecked by Gold, Travell, and Modell in 1937. A larger number of animals were used and the size of the infarcts was accurately measured by a planimeter. Smith's results were not confirmed. In spite of the ex-

tensive literature in support of the xanthines and some laboratory work, such as that quoted against them, there is a growing belief that these drugs are of little value in the treatment of angina pectoris. I do not wish to discredit these drugs, as they are useful diuretics, and, indeed, an intravenous dose of aminophyllin may be most valuable in relieving the Cheyne-Stokes breathing of cardiac or renal failure. However, I wish to associate myself with those who believe that these drugs have little or no place in the routine treatment of angina pectoris.

*The nitrites.*—I am aware that the mechanism of pain-production in effort angina is still a matter of much controversy. If one accepts the ischæmia theory then the nitrites have a rational place in therapy. However, there has been some argument that they have no place; indeed, Master, Jaffe, and Dack recently investigated the effect of sixteen drugs including a placebo on angina pectoris due to coronary artery disease and found that no drug exerted any specific effect and that the best result was obtained from a placebo. In recent years we have heard the same sort of argument with reference to the use of alkali in peptic ulcer. However, it is difficult for any clinician, familiar with the prompt relief from pain which the alkalies give in peptic ulcer and the nitrites in angina pectoris, to believe that these drugs have no place in the treatment of these diseases. If we accept the ischæmia theory of angina pectoris, the effect of the nitrites is rationally explained by the relaxation of smooth muscle with a resulting increase in coronary flow and a lessening of the cardiac load by a reduction in the systemic blood pressure. There is a danger inherent in the latter effect, as too great a drop in the systemic blood pressure lessens the coronary flow. There is a further risk from their use in the acute phase of coronary thrombosis in that the nitrites reflexly stimulate the cardiac accelerators and may produce dangerous tachycardias.

The most satisfactory preparation is the tablet triturate of glyceryl trinitrate, gr. 1/150. In this dosage the disagreeable side-effects such as headache, throbbing in the head, flushing, and palpitation are less pronounced than in the more commonly used dosage of gr. 1/100. The average patient's fear of overdose or habituation will frequently delay taking the drug

until the pain is severe, and accordingly he must be reassured in this connection. As many as 50 tablets a day may be taken if necessary and indeed Levine has reported the case of a woman who took 1,000 tablets in a week without harm. It is well to begin with the smaller doses of 1/200 or 1/150 grain, as a bad headache precipitated at the beginning by a larger dose may create a prejudice in the patient's mind that is difficult to overcome.

Levy has recommended erythrol tetranitrate in a dose of 1/2 gr. at bedtime to prevent night pain. It has a more prolonged effect than glyceryl trinitrate and is a useful drug used in this way.

It is doubtful whether amyl nitrite has any longer a place in the treatment of angina pectoris. It is more rapidly absorbed, the dosage is more difficult to control, and even the five-minim perle may precipitate collapse of the patient who is most careful to inhale it all.

At times a patient will report a bout of pain which was not relieved by the nitrites as previously had been the case. Under these circumstances one must suspect a small cardiac infarct, and an electrocardiogram may give the answer.

*The barbiturates.*—Sedatives play an important rôle in the treatment of coronary artery disease, and at present drugs of the barbituric acid group are very popular. By controlling nervous excitability they may control the number of attacks of angina; in coronary thrombosis they quiet fear and apprehension. Meek and Seavers found that ectopic rhythms produced experimentally by ephedrine could frequently be prevented by sodium barbital. Thus these drugs may exert such a protective action in human beings. It is doubtful whether it is ever advisable to give more than 1/4 to 1/2 grain of phenobarbital three times daily. Larger doses may produce stupor and motor unrest and thus defeat their purpose.

In the time allotted this paper, I have made no attempt to outline a routine of treatment of either coronary thrombosis or angina pectoris, and I have not attempted to discuss all therapeutic procedures as applied to either condition. For example, the use of oxygen for the relief of pain in coronary thrombosis and paravertebral injection for relief of pain in severe cases of angina pectoris I have not mentioned. Further, I have not discussed therapeutic procedures that have been employed by those who

believe in the mechanical theory of pain production in angina pectoris. Mechanical procedures for the relief of cardiospasm and Kerr's abdominal support are mechanical procedures for the relief of angina pectoris. The relief such measures at times give does not deny the ischaemia theory, as there is probably a reflex arc between the gastro-intestinal tract and the coronary bed, most likely through the vagus. However, the psychic factor in angina pectoris is so considerable that it is difficult to put a value on any such therapeutic procedure, as often a placebo will give these patients relief.

For the purposes of this paper I am accepting the ischaemia theory of pain production, and to most of us, I am sure, this theory is the most reasonable one yet advanced. If we accept it the relief of pain the nitrites give in angina pectoris is readily understood.

The term "angina pectoris" has been used in medicine since Heberden first used it in 1768, and it would seem to have outlived its usefulness. Before the work of Herrick and, later, Parkinson and Bedford, it was associated in the minds of physicians with sudden death, and this association still persists in the minds of the laity. How often have we all heard patients with praecordial pain or discomfort ask anxiously, "Is it angina pectoris?" The term "effort angina" more nearly describes the symptom, and it is highly desirable that it come into more general use.

Most patients with effort angina are ambulatory. In these, treatment should be designed to protect their cardiovascular system so far as is necessary and at the same time to help them to readjust their lives so that they may be as useful and happy as possible. The degree of discomfort varies with the extent of the coronary lesions, the nature of the patient's activities, and his emotional make-up. Sometimes one of these factors is predominant in the production of symptoms. Indeed, we all have seen the anginal syndrome in patients without demonstrable evidence of coronary disease, and have seen the symptoms disappear and the patient later live a normal life. If we accept the ischaemia theory it may then be argued that spasm with little or no sclerosis may be the factor inducing pain. Certainly the degree of sclerosis is not the only factor determining that a given patient will have angina. It would appear that as there is a personality

factor that determines that one patient with syphilis will develop paresis whereas another will not, so the same thing seems to be true of angina. Since this is the case our attitude toward the patient and his problem should be a hopeful one. After the patient has been properly examined as he has a right to expect, and after his first question, "Have I angina pectoris?" he will next ask, "What is my future to be?" In reply to this he should be told the truth, but not necessarily the whole truth. This is not dishonest, as we cannot definitely anticipate the future of many of these patients, and we must remember we are trying to re-establish a patient with a disability and should try to avoid increasing his invalidism. The most difficult case of effort angina I have ever had was in a woman, who before I saw her was given a diagnosis of angina pectoris and had drawn for her a picture of a sclerosed coronary artery with a narrowed lumen followed by an explanation as to how thrombosis might occlude this artery and cause sudden death. I have watched this woman for ten years and she is yet alive and well; the drawing has done her more harm than has her coronary artery disease. To the patient, the emphasis should be on the "effort" rather than on the "angina" and if this is done many of these patients will require no drugs at all. The substitution of less violent effort, for example in the matter of sports, perhaps the substitution of golf for tennis, and the discipline of the avoidance of worry will do much to re-establish them. Accordingly, if we can remove the patient's greatest worry, that related to his coronary circulation, we shall have done much to re-establish him.

There has been much therapeutic nihilism these past few years, and several writers have found placebos to have as much value as nitroglycerin in the treatment of effort angina. Few clinicians will agree with that viewpoint, as most of us are convinced of the value of this drug in relieving the pain of effort angina. However, I am convinced that better results will be had from its use if it is used to prevent rather than to relieve pain. A given measure of effort, such as walking to a certain corner, or ascending a certain grade, will be found to induce pain. A tablet of nitroglycerin before the exercise is undertaken will prevent the pain. Using this method these past few years I have repeatedly

seen the pain disappear, and later have had the patient return to me with some other complaint and not mention his heart. Recently I had referred to me a man who told me that he had taken 5,000 tablets of nitroglycerine during the past two years. As he left another man came in who had had a severe angina three years ago and who had much more objective evidence of coronary sclerosis than had the first. I asked the second man how many tablets he was taking and he told me that he had taken 25 to 30 tablets over a period of nine months. The patient's fear of toxic effect, of habituation, and of his pain-relieving drug losing its effectiveness must be overcome.

It is seldom that other drugs are necessary in the treatment of effort angina. The xanthines have already been discussed and amyl nitrite offers no advantage over nitroglycerin, and, in comparison, has distinct disadvantages.

Low-grade auriculo-ventricular block, bundle-branch lesions and changes in the QRS complex of the electrocardiogram are commonly found in those with coronary sclerosis. These changes should be accepted as evidence of an underlying coronary sclerosis and are for the physician's records. They do not deserve unnecessary emphasis to the patient, and such emphasis tends

to the production of invalidism. I have recently seen a man in his sixties with a moderate arteriosclerosis, a normally-sized heart producing no symptoms, but with electrocardiographic evidence of a bundle-branch block, who had been invalidated some years by this diagnosis.

The estimation of the amount of effort to be allowed a given patient with effort angina requires our best judgment, and in estimating this, there is, I believe, a wide diversity of opinion throughout the profession at large. In a recent questionnaire submitted to representative physicians over this continent twice as many interdicted the driving of automobiles in those with coronary sclerosis as in those recovered from coronary thrombosis. This is an astonishing state of affairs. We accept effort angina as an evidence of coronary sclerosis, and we recognize that many patients with coronary sclerosis do not have angina; then, if we are to be consistent, we should advise all those with coronary sclerosis against driving automobiles, which is, of course, absurd. There can be no fixed rule about it, but each case must be individualized, and our aim should be to re-establish each patient in the greatest measure of usefulness consistent with his cardiac ability to carry the load.

#### A COMPARATIVE STUDY OF THREE SPINAL ANÆSTHETIC AGENTS: (A NEW TECHNIQUE FOR NUPERCAINE)

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SINCE the remarkable return to favour of spinal anaesthesia in 1928 a number of spinal anaesthetic agents have been used with varying degrees of success. Of the many agents used three have received the most popularity, novocaine, pontocaine and nupercaine. We present these for comparative study.

The following is a report of 696 consecutive spinal anaesthetics administered in the main operating room of the Royal Victoria Hospital during the six months' period from January to June, 1940, inclusive. In this institution, approximately 1,500 spinal anaesthetics are administered yearly, and those administered during the above months may be assumed to be characteristic of all. Of these, pontocaine was used for 477 operations, nupercaine for 161, and novocaine for 58. The surgical pro-

cedures undertaken and the drugs used for each are shown in Table I. The complete absence of gynaecological operations is explained by the fact that this type of surgery is

TABLE I.  
CLASSIFICATION OF OPERATIONS

	<i>Novo- caine</i>	<i>Ponto- caine</i>	<i>Nuper- caine</i>
Thoracic.....	37	63	3
Stomach and intestines.....	37	63	71
Liver, gall bladder and bile ducts.....	..	..	57
Abdomino-perineal resections.....	7	110	14
Herniorrhaphies.....	3	210	2
Appendectomies.....	2	55	1
Orthopaedic.....	7	33	11
Genito-urinary.....	2	6	..
Miscellaneous.....	Total.....	58	477
			161

confined to a separate department of this institution, and these cases were not reviewed. It will be noted that the use of nupercaine predominated for operations upon the stomach and intestines (gastrectomies, gastrostomies, gastro-enterostomies, bowel resections), and upon the gall bladder and bile ducts, it being our custom to use nupercaine for prolonged operations in the upper abdomen, and to limit pontocaine to shorter operations in the lower abdomen, genito-urinary system, and lower extremities. The use of novocaine was confined almost exclusively to short operations upon the rectum and genito-urinary organs, where only the lower sacral segments needed to be anaesthetized.

Of the nupercaine spinal anaesthesia three were given by the Howard Jones technique,<sup>1</sup> and the remainder by a modified Etherington Wilson technique, using the hypobaric (of specific gravity less than that of the cerebro-spinal fluid) 1:1,500 nupercaine solution. When the Howard Jones technique was employed the patient was placed in the lateral recumbent position and injection made into the third lumbar interspace. Following injection the patient was placed in the ventral decubitus position, to enable the light solution to impregnate the posterior roots, and maintained in this position for 6 minutes. The patient was then turned on his back, with the head of the table slightly lowered, and maintained in this position throughout the operation.

But by far the greater number of our nupercaine cases were done by the sitting-up method. The usual technique employed differs in no essential from that prescribed by Etherington Wilson,<sup>2</sup> except that of dosage and time allowance. The maximum dosage of the nupercaine solution to be injected was calculated by allowing 1 c.c. of nupercaine solution for each inch of back length, as measured from the spinous process of the seventh cervical vertebra to the interiliac line, with the back in full flexion, up to a maximum of 20 c.c. of nupercaine. Smaller doses were employed for poor-risk patients. It has been found by measuring adult backs in this manner that the length varies between 16 and 22 inches. This obviously necessitates a different time allowance for the nupercaine to rise, proportionate to the length of the back. Thus, for a 16 inch back we would allow 45 seconds to reach the level of D.5, and for a 22

inch back we would allow upwards of 60 seconds to reach the same level. Ephedrine, gr. 1 to 1½ contained in 1 per cent novocaine solution for local infiltration, was injected at the site of the proposed lumbar puncture five minutes before the spinal puncture. The lumbar tap and injection of warmed nupercaine solution (104° F.) was done with the patient in the sitting position, the tap always being made through the third lumbar interspace. Since nupercaine is precipitated out in the presence of alkali, the syringes and needles to be used were first rinsed with slightly acidified sterile water. The nupercaine solution was delivered into the spinal canal at a constant temperature (104° F.), the injection being made slowly and deliberately at the rate of 1 c.c. a second. The solution was allowed to rise from 45 to 60 seconds from the commencement of the injection, depending upon the height of anaesthesia desired, after which the patient was placed in a 5° Trendelenburg position and maintained thus throughout the operation. This was the usual procedure when nupercaine was used for abdominal operations, but for the operation of combined abdomino-perineal resection of the rectum a different procedure was used.

#### ANÆSTHESIA FOR ABDOMINO-PERINEAL RESECTION OF THE RECTUM

Nupercaine, 1:1,500, the light solution, is admirable for operations in the upper abdomen as it attacks the dorsal roots chiefly. However, it is not so powerful in its effects on the sacral and lumbar roots, and for this reason one of us (F.A.H.W.) has developed a technique suggested by a visit to M. D. Nosworthy, at St. Thomas's Hospital, London, in 1936. At that time Nosworthy was employing a combined technique, with two solutions of nupercaine (a) 1:1,500 and (b) 1:200.<sup>3</sup> To make certain of producing sacral as well as dorsal anaesthesia for long abdominal operations which necessitate working deeply in the pelvis, he suggested that 10 c.c. of 1:1,500 nupercaine should be injected between lumbar 3 and lumbar 4, and 0.8 c.c. of 1:200 nupercaine immediately afterwards. When the patient lies flat on his face the 1:1,500 nupercaine is attending to the dorsal roots in the usual way, while the 1:200 produces sacral anaesthesia. This procedure gives better results than the injection of a larger quantity of 1:1,500 nupercaine coupled with

immediate tipping of the table (into the Trendelenburg position).

This method as employed by Nosworthy implied the routine use of the Howard Jones method. However, by this time we were more and more leaning to the use of the Etherington Wilson technique for nupercaine wherever possible, and gave our attention to modifying Nosworthy's method to suit our own particular preferences. By reversing the order of injection of the solutions of nupercaine, and making the 1:200 solution definitely hyperbaric with 6 per cent glucose this was accomplished.

The patient is placed in the sitting position with his feet hanging over the end of the table, and with the back well flexed forward. After ephedrine, gr. 1½, has been given subcutaneously at the third lumbar interspace the spinal puncture is performed at that level and 1.0 to 2.0 c.c. of nupercaine 1:200 (in 6 per cent glucose to make it definitely heavier than spinal fluid) is injected. This settles down immediately into the bottom of the spinal canal and attacks the sacral roots powerfully. At the end of two minutes, 15 c.c. of nupercaine 1:1,500 are injected and allowed to rise for 45 to 60 seconds, and the patient is then promptly placed in a very slight Trendelenburg position to prevent upward spread of the light nupercaine. A marked Trendelenburg position is contraindicated as the heavy 1:200 nupercaine-glucose solution might spread up too high above the sacral and lumbar roots where it is most needed. The above dosages are adequate for the usual operations in the pelvis, but, on occasion, for a very long operation, as much as 2 c.c. of 1:200 nupercaine and 20 c.c. of 1:1,500 nupercaine have been injected without ill effects, and in one instance afforded an anaesthesia of 4 hours and 50 minutes without supplementary anaesthesia (see Table II). This is a striking tribute to the relative non-toxicity of nupercaine as a spinal anaesthetic agent.

Pontocaine<sup>4</sup> was administered in the form of 2 c.c. of 1 per cent pontocaine HCl made definitely hyperbaric by the addition of 2 c.c. (or equal parts) of 10 per cent glucose in normal saline solution. It is our belief that the anaesthesia comes on more rapidly with the addition of the glucose-saline mixture, and that the height of the anaesthesia is more easily controlled by this method, advantages that outweigh the theoretical disadvantage of the introduction of

an additional foreign substance into the spinal canal. The injection was made with the patient in the lateral recumbent position, without barbotage, the height of the anaesthesia being controlled by varying the interspace into which the injection was made, and by posturing the patient after injection. For operations upon the perineal structures the injection was made while the patient was in the sitting position, and maintained in this position for at least two minutes after injection, thereby producing an intense and prolonged anaesthesia of the perineum only. The dosage was practically routine, being 2 c.c. of the 1 per cent solution (20 mg.), except for children and for poor-risk patients when slightly smaller doses were used. Ephedrine, gr. ¾, was administered routinely by hypodermic injection five minutes before the spinal anaesthetic.

The technique for administration of novocaine was essentially that of pontocaine. Doses varying from 75 to 200 mg. were used, each 50 mg. of novocaine crystals being dissolved in 1 c.c. of spinal fluid and injection made without barbotage.

TABLE II.  
SUCCESS OF ANAESTHESIA

	Number given	Number successful	Percentage successful	Longest anaesthesia	Operative time expected
Novocaine	58	58	100	1 h. 10 m.	1 hr.
Ponto- caine . . .	477	468	98.1	2 h. 20 m.	2 hrs.
Nupercaine	161	140	87	4 h. 50 m.	3 hrs.

The percentage of successful anaesthesias, as adjudged by whether or not supplementary anaesthesia was required before the operation could take place, is shown in Table II. Supplementary anaesthesia was required in cases other than those in which the spinal anaesthesia failed for operations which lasted longer than the duration of the spinal anaesthesia. In only one case was supplementary anaesthesia required for a pontocaine spinal anaesthesia when the operation lasted less than two hours.

The complications encountered with spinal anaesthesia while the patient was in the operating room are shown in Table III. One death occurred in this series, and that was in a moribund patient with advanced paralytic ileus, who received 150 mg. novocaine spinal anaesthetic for therapeutic purposes only. All drops in blood pressure to a level less than two-thirds of the

pre-operative systolic pressure are recorded, and this complication was easily overcome by placing the patient in the Trendelenburg position, and administering intravenous fluids. In no instance did this complication interfere with the surgical procedure. Respiratory difficulties occurred only in those patients who had received nupercaine spinal anaesthesia; this complication was managed successfully in all cases by the

TABLE III.  
OPERATIVE COMPLICATIONS

	<i>Novo-</i> <i>caine</i>	<i>Ponto-</i> <i>caine</i>	<i>Nuper-</i> <i>caine</i>
		Percent- age	Percent- age
Circulatory depression . . . . .	0	1.05	8.7
Respiratory depression . . . . .	0	0	2.5
Deaths . . . . .	1*	0	0

\*Aspiration of vomitus immediate cause of death (spinal for paralytic ileus).

administration of oxygen, either by oral or intratracheal insufflation, and by the administration of respiratory stimulants. This complication was severe enough in one instance, however, that the operation had to be postponed until a later date. Respiratory and circulatory accidents occurred usually within ten minutes, and never later than thirty minutes after the intraspinal injection was made. Nausea and vomiting during the operation occurred in approximately 15 per cent of cases, although our figures for this are not accurate. This was quite easily overcome in most instances by the administration of 95 per cent oxygen and 5 per cent carbon dioxide by the face mask, and constituted only a minor annoyance to the surgeon.

TABLE IV.  
POST-OPERATIVE COMPLICATIONS

	<i>Novo-</i> <i>caine</i>	<i>Ponto-</i> <i>caine</i>	<i>Nuper-</i> <i>caine</i>
	Percent- age	Percent- age	Percent- age
Deaths . . . . .	0	0	0
Headache . . . . .	22.0	12.0	8.0
Urinary (catheterization) . . . . .	0	3.0	6.0
Backache . . . . .	2.0	2.1	1.2
Pulmonary:			
(a) pneumonia . . . . .	0	1.2	1.7
(b) bronchitis . . . . .	0	1.8	1.2
(c) atelectasis . . . . .	0	0.6	0

The post-operative complications most frequently encountered are shown in Table IV. For the sake of completeness we have assumed that all headaches occurring in the post-operative

course were due to the spinal anaesthetic, although obviously a certain percentage of these patients would have had headaches in their post-operative course irrespective of the type of anaesthesia employed. It is interesting to note that novocaine caused almost twice as many headaches as pontocaine, and almost three times as many as nupercaine. But in all fairness to the drug it should be stated that in most instances in which it was employed the injection was made while the patient was in the sitting position, a posture which may have accentuated the post-puncture dural "leak". All instances of necessity for catheterization for post-operative urinary retention are recorded, although it is difficult to say that the spinal anaesthesia actually aggravated the usual tendency to post-operative difficulty in voiding. Backache was an infrequent complaint. It is quite possible that the increased strain upon the ligaments of the back due to the relaxation of the muscles by the anaesthetic, the hard operating table, and not infrequently the strained position in which the patient is placed, were as instrumental in producing backache as the actual trauma produced by the introduction of the spinal needle. The backache in all cases had disappeared by the time the patient was discharged from the hospital. Those patients having pulmonary complications all recovered with the exception of two patients in which bronchopneumonia was the terminal event, being secondary to diffuse peritonitis in both instances. It is impossible to say whether the post-operative nausea and vomiting which occurred not infrequently was due to the anaesthetic agent or to the operative procedure. Other complications reported in the literature, such as meningismus, meningitis, abducens palsy, and temporary or permanent paraplegia did not occur in this series.

A nervous and apprehensive patient is a poor subject for spinal anaesthesia unless proper attention is paid to pre-operative and operative sedation. Then he becomes much the same as any other and can be handled accordingly. Proper and adequate pre-operative medication is essential to successful spinal anaesthesia. This means usually that a healthy young male adult should receive morphine sulphate, gr.  $\frac{1}{4}$ , and hyoscine, gr.  $1/100$  a full hour before the time of operation. Females and poorer male risks will do better with morphine sulphate, gr.  $1/6$ , and hyoscine, gr.  $1/150$ , also given an hour before operation. We do not believe in

giving more than this amount of sedative until the spinal anæsthetic has been given and the level of anæsthesia determined. This prevents the accident of having a spinal anæsthetic ascend too high before it is detected and remedial measures undertaken; and also prevents the possibility of having an inadequate level of anæsthesia due to sluggish responses from a heavily narcotized patient, giving one a false sense of security as to the adequacy of the anæsthesia. Once the anæsthetist is satisfied that the anæsthetic is high enough and not too high, and that the patient is not undergoing a marked fall in blood pressure, the above dosage of morphine and hyoscine, as given an hour before operation, is repeated. In long drawn-out operations extending over three or four hours we have found it advantageous to repeat the morphine at intervals of an hour until gr.  $\frac{3}{4}$  have been administered, but do not give more than two injections of hyoscine, as we find that such patients tend to become uncooperative, and tug at their wrist restraints or more characteristically insist on raising the head repeatedly and thus tighten the abdominal muscles.

By the judicious use of ephedrine sulphate<sup>5</sup> before the spinal anæsthetic is given we find that we have very little cause to employ adrenalin or pitressin-ephedrine mixture during the operative course of the anæsthetic. All spinal anæsthetic patients with normal blood pressure receive ephedrine-sulphate, gr.  $\frac{3}{4}$ , dissolved in 1 c.c. of 1 per cent novocaine as a local injection over the site of the puncture. This is given five minutes before the spinal tap and usually raises the systolic pressure from 10 to 20 points. The spinal anæsthesia following upon this usually results in the pressure falling back to normal levels after about twenty minutes, and in lower abdominal operations this level stays fairly constant.

In all high nupercaine anæsthetics we give ephedrine-sulphate, gr. 1 to  $1\frac{1}{2}$ , before operation, as mentioned before, and obtain much the same result. Patients with high blood pressure receive the double dose of ephedrine as near to the exact moment of the spinal tap as possible so that the rise from the ephedrine is counteracted by the marked fall from the spinal anæsthetic which is characteristic of this type of patient. It is a mistake to give large doses of

ephedrine too far in advance of the actual lumbar puncture in these cases.

On the other hand, patients with markedly low blood pressure can almost always be given the advantage of a spinal anæsthesia if they are given ephedrine, gr.  $1\frac{1}{2}$ , a full ten or fifteen minutes before the spinal injection, and an intravenous saline commenced at the same time to control subsequent changes in blood pressure. The giving of a large dose of ephedrine in advance has given us an indication of the responsiveness of the neurovascular system to stimulation, and if we obtain a rise in blood pressure from a pre-operative level of 80 mm. to 110 mm., as is often observed, one does not hesitate to go ahead with a high spinal anæsthetic if one has an intravenous infusion in place and running freely.

We believe that spinal anæsthesia, when administered by experienced hands, is ideal for all surgical operations below the diaphragm because of its relative safety and because it affords ideal working conditions for the surgeon. Spinal anæsthesia is the method of choice in this institution as is shown by the fact that 42 per cent of all anæsthetics given in the main operating room of the Royal Victoria Hospital during the year 1939 were spinal anæsthetics. If these figures were confined to general surgery alone, the percentage would be much higher. The surgeons operating here are uniformly grateful for the profound relaxation which the method affords. Of the three spinal anæsthetic agents employed, we believe that pontocaine is the best all-around agent because of its simplicity of administration, ease of control, duration and low incidence of failures. Nupercaine, although more dangerous, definitely has a place in spinal anæsthesia, particularly for prolonged upper abdominal operations, and for the operation of combined abdomino-perineal resection of the rectum. Novocaine, although supposedly less toxic than the other agents, is attended by a higher incidence of post-operative headache, and the duration of anæsthesia which it produces is inadequate for many surgical procedures.

#### SUMMARY

1. Six hundred and ninety-six cases of spinal anæsthesia employing novocaine, pontocaine and nupercaine are presented for comparative study.

2. The standard methods employed for the administration of these three drugs are considered.

3. A new method for abdomino-perineal resection of the rectum under nupercaine anaesthesia is presented.

4. All things considered, pontocaine affords the most advantageous form of spinal anaesthesia for the average surgical operation below the diaphragm.

5. The importance of pre-operative and operative sedation and routine pre-operative ephedrine is stressed.

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## PITFALLS IN GYNÆCOLOGICAL DIAGNOSIS\*

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THE rational treatment of disease is based on accurate diagnosis. Mistakes in diagnosis are more often responsible for incorrect treatment than lack of knowledge of treatment. The mental picture of a diagnosis is built up from two components—the complaint of the patient and the findings of the physician. Many early diagnoses are missed by a casual dismissal of significant symptoms. At other times there is a confusion of cause and effect as some minds work in terms of symptoms rather than of underlying pathology. It is also true that anatomical change is more readily appreciated than are physiological derangements. Knowledge of pelvic anatomy is concrete and established, while the science of female pelvic physiology is in a constant state of flux. It is natural that the obvious may sometimes obscure that which is partly hidden and so treatment fall short of cure because of a faulty diagnostic foundation.

The misconception that irregularities in the menses are to be accepted as normal during the menopause is deeply rooted in the minds of many, including, unfortunately, a certain number of physicians. After working for some years in a gynaecological cancer clinic, one is impressed by the large number of women with advanced carcinoma of the cervix who have been treated with ergot or some other medication without a vaginal examination. The growing tendency today to treat menorrhagia at the menopause by other means than surgery, either

irradiation or some endocrine preparation, results in an inexcusable neglect of curettage. The only hope of lowering the death rate from uterine cancer is early diagnosis based on curettage or biopsy.

Vaginal discharge should not be treated until the nature and localization of the causative factor is known. Palpation and visual examination of the vaginal walls and cervix with smear and culture may uncover anything from unsuspected carcinoma to *Trichomonas vaginalis* vaginitis. Carcinoma in any location may progress to a very advanced state as a silent disease, and cancer-conscious watchfulness is essential. The widespread age incidence of the disease should not be forgotten. A short time ago a young woman in her twenties was treated for weeks on our own service for acute cervicitis before the malignant nature of the trouble was determined by biopsy.

When a woman has an irregularity of menstruation two conditions should be kept in mind—malignant disease and pregnancy. Even intra-uterine pregnancy may be difficult to determine in the early weeks, but with the exception of endometriosis no other pelvic condition presents so many difficulties in diagnosis as ectopic pregnancy.

The so-called subacute and chronic types of ectopic pregnancy present the most perplexing problem. The difficulty of establishing the fact of pregnancy in its early stages, the vagueness of the history which so many patients give, and failure of interpretation by the physician, all contribute to the difficulty. The diagnosis lies between abortion, pelvic inflam-

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mation and ectopic pregnancy. The irregular bleeding which marks this condition comes on occasionally before a period has been missed. More often, after some delay in menstruation, irregular spotting occurs. Profuse bleeding, however, does not rule out the possibility of ectopic pregnancy. Pain is practically a constant feature. It is due to the escape of blood into the peritoneal cavity and inflammatory reaction about the tube. It is crampy and intermittent, and entirely different from the tearing prostrating pain which marks the case of acute tubal rupture.

Examination usually demonstrates the presence of a pelvic mass, and there is tenderness on deep abdominal palpation and on moving the cervix. Much has been said, pro and con, regarding the merit of posterior colpotomy. It is a valuable diagnostic measure but has two drawbacks, namely, the danger of infection from indifferent aseptic technique, and the confusion which may arise from any bleeding that occurs from the operation itself. Needle puncture has its advocates but the margin of error is high.

The Ascheim-Zondek test, when time permits, is invaluable in establishing a diagnosis of pregnancy. The combination of a high white blood count, which in our experience has been as high as 26,000, a low haemoglobin content and a slow sedimentation time are highly indicative of ectopic pregnancy. Broadly speaking, the picture is one of pelvic inflammation and anaemia.

Haemorrhage from the ovary, either from a Graafian follicle or from a corpus luteum, may present findings which make diagnosis difficult. Occasionally, the condition may be mistaken for ectopic pregnancy, but in the majority of cases the diagnosis is confused with appendicitis. During the last ten years, 72 such cases have been diagnosed on the public wards of the Toronto General Hospital. Fifty-two, that is, 72 per cent of the patients, were between fifteen and twenty-five years of age. Typically the onset of pain is about two weeks after a menstrual period, which coincides with the generally accepted time of ovulation. Variations in this relationship may be accounted for by irregularities in the periodicity of ovulation or in other cases where the haemorrhage came from a corpus luteum. A review of the cases suggests that in a patient with right-sided

lower abdominal pain and tenderness it is possible to simulate the condition of mild haemorrhage from a follicle by traumatizing the ovary in drawing it up through the limited opening of a McBurney incision. It would appear that an incision which allows more ready exploration of the pelvis should be used in the female whenever the diagnosis is doubtful.

The onset of pain in haemorrhage from a Graafian follicle is sudden, sharp and sometimes aching. Often there follows a latent painless period and then the pain returns and remains more or less constant. Nausea is common, but vomiting rare. Deep tenderness is present over the lower abdomen, but more often on the right side, as a result of which the diagnosis of appendicitis was made forty-eight times. Rigidity is not marked. The pulse and temperature are elevated at first. Typically the white blood count is raised out of proportion to the pulse and temperature. The highest count recorded in this series was 34,000, and this dropped to 13,000 in twelve hours. Rapid drop in the white blood count is usual, one case showing for example 30,000, 26,000, 14,000 and 5,000 white blood cells at two-hour intervals. Ten other patients had blood counts over 15,000. There seemed to be a relationship between the amount of bleeding from the ovary and the blood count and temperature. Ten patients had temperatures over 100° on admission. The highest temperature recorded was 102°. Generally, however, normal temperature was the rule, even when the pulse was fast.

Four cases of ovarian follicular haemorrhage were diagnosed as ectopic pregnancy. There was a history of faintness. Pain and tenderness were more general in distribution. Vaginal examination determined an indefinite mass with tenderness to the side of the uterus, and in two cases posterior colpotomy showed free blood in the pouch of Douglas. In the ten-year period greater familiarity with the manifestations of the condition and closer attention to the menstrual cycle have resulted in the diagnosis in these cases changing from appendicitis to appendicitis probably Graafian follicle haemorrhage, and then Graafian follicle haemorrhage, probably appendicitis, and, now, often Graafian follicle haemorrhage. More accurate diagnosis eventually means fewer needless operations.

In 1921 Sampson first drew attention to the condition of endometriosis. He has found it

present 98 times in 322 operations and continues to emphasize its frequent occurrence. The incidence, as reported by others, appears to vary with the keenness of the clinical and pathological observation. No other gynaecological condition presents such difficulty in diagnosis. Wherever endometrial tissue implants it may give rise to pathological change. Typically, the picture is a disturbance of the genital tract. However, the vagaries due to endometriosis are many. For example, at the Toronto General Hospital post-operative pathological report has found it responsible for three recto-sigmoid excisions performed on a clinical diagnosis of carcinoma.

The typical history in endometriosis shows three frequent associations, namely, primary or secondary sterility, a previous pelvic operation, and uterine fibroids. The patient has two complaints, pain and bleeding. Pain generally is located in the lower abdomen, begins sometimes in the fourth decade, and tends to be chronic, with exacerbations in the form of increasing dysmenorrhœa. Menorrhagia is characteristic, but in those rarer cases where the condition involves other structures bleeding may occur from bowel, bladder or vagina.

The usual findings in endometriosis are loss of mobility of the uterus with a tender mass in the pelvis. The tenderness is increased in the premenstrual period. Many times the diagnosis of endometriosis is not considered until the abdomen has been opened. The chocolate blood cyst, the dense, almost inseparable adhesions, the deforming infiltration of tissue, with the small purple-black implantation nodules on the ovary or adjacent surfaces are distinguishing features of the condition.

Most patients seek medical advice because of pain. La Rochefoucauld has said that pain is the greatest liar in the world, and Chipman adds that of all the painful liars backache is the greatest Ananias or Sapphira. Certainly of all female complaints backache so common in occurrence is the most frequently misinterpreted. The two worst examples of faulty judgment frequently observed in gynaecology today are the surgical removal of the so-called painful and sometimes cystic ovary in the absence of inflammatory disease, and the suspension operation for retroversion of the uterus hastily performed in the hope of curing backache.

During the last three years, 206 women admitted to the gynaecological service of the

Toronto General Hospital had uterine retroversion, but only 40 per cent complained of backache. These 206 cases were classified into groups such as uncomplicated retroversion, retroversion with associated inflammatory disease, etc., and a table is presented showing the incidence of backache in four of the major groups and the results of suspension operations in the relief of those patients suffering from backache. Discrepancies are due to an incomplete follow-up.

TABLE I.

	No backache	Suspension operation	Cured	Failed
Uncomplicated .	33	44	28	8
Pelvic inflammation .	13	8	10	1
Relaxed vagina and perineum.	19	13	13	2
Prolapse .....	5	6	4	1
				3

It is seen that less than half the women with uncomplicated retroversion had backache, and less than half of those who reported to the post-operative clinic were relieved of backache by operation. Two women in this group with backache, subjected to operation, were not relieved and when the persisting backache was thoroughly investigated x-ray demonstrated spinal arthritis. Twenty-one patients had pelvic inflammatory disease associated with retroversion, generally an adherent retroversion without massive disease of the adnexa. As might be expected, most of these women had backache but the results of suspension of the uterus were very disappointing.

Retroversion with associated relaxation of the pelvic supporting structures presents an interesting study. Thirty-two patients had associated cystocele, rectocele, or relaxed perineum. Unfortunately, only four patients who had a suspension operation reported to the post-operative clinic, and two of these had not been relieved. At the same time two patients who had only a pelvic repair were relieved of backache, although the uterus still remained retroverted. Eleven patients were seen who had well developed prolapse of a retroverted uterus, and only one of four who had had a uterine suspension performed was cured of backache. During the last three years thirteen patients with procidentia have been admitted to the service. Only two of them complained of backache. If the cause of backache is due to a drag on the supporting ligaments it might be concluded that the more

marked the prolapse, the more severe the complaint. The observations as detailed above do not bear out this belief. Another widely held opinion is that the backache associated with retroversion depends on congestion of the uterus. In the group of patients in which congestion of this organ would be most likely, namely, those complaining of menorrhagia and in whom either the uterus was enlarged or the endometrium thickened and hyperplastic, only 2 of 19 complained of backache.

In spite of the view that retroversion rarely causes backache it remains true that occasionally it does so. These cases may be determined fairly accurately by means of the test of relief of backache following replacement and insertion of a pessary, and then noting its recurrence when the pessary is removed and the retroversion recurs.

The decrease in the number of suspension operations performed on the gynaecological service at the Toronto General Hospital is indicative of a change in opinion such as has been advocated in this paper.

The causes of backache are legion and investi-

TABLE II.

	<i>Abdominal operations</i>	<i>Suspension operations</i>
1919 .....	148	64
1920 .....	150	55
1921 .....	170	66
Average percentage .....	182	40
1937 .....	246	25
1938 .....	210	28
1939 .....	210	9
Average percentage .....	210	10

gation should be thorough before the patient is subjected to an abdominal operation. Faulty posture, a weak abdominal wall, fatigue spasm of the erector spinae muscles, and sacro-iliac strain are common causes. Personal experience has been that a good pair of shoes and a well-fitting corset will cure far more female backaches than the Gilliam operation.

Misinterpretation of fact is the great feature in faulty diagnosis. It is only by constantly striving to see through the signs and symptoms which are the glass by which one should focus on the underlying disease that it is possible to acquire that acumen which marks the true physician.

## GONOCOCCAL PELVIC INFLAMMATION\*

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DURING the past few years much has been written on the treatment of gonococcal infection with a group of drugs classed under the general heading of sulphonamides. So much so, that in some quarters one gains the impression that the Neisserian problem, for all practical purposes, finally has been solved; with prevention and other aspects of treatment assuming less and less importance. It is proposed therefore to review the steps in the development of gonococcal pelvic inflammation particularly from the standpoint of the prevention of pelvic invasion, and as a logical and more interesting approach to the clinical features and the modern therapy of this infection.

That gonorrhœal infection is widespread is well known. It occurs with varying frequency in all areas of the inhabited surface of our belligerent world, with war itself a major factor

in furthering the spread of the disease which produces an appreciable drain on our war-time economic resources. There is abundant evidence that intelligent treatment, initially, in gonorrhœa provides the main defence against the complicating extensions of the disease. With modern treatment there has been ever increasing evidence of reduction in the incidence of such complications. In 110 cases of culturally proven gonorrhœa in females recently treated at the special treatment clinic of the Toronto General Hospital no patient developed pelvic inflammation during or following ambulant sulphonamide therapy. The latter comprised the use of sulphanilamide, di-sulphanilamide and sulfapyridine. The majority of these cases were either in the sub-acute or early chronic stage when first observed. Of the group of 110 cases four presented evidence suggesting beginning extension of gonococcal infection to the pelvis, with definite bilateral tenderness and slight fever. No further development of the inflammatory process

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ensued. Because of the decreasing incidence of pelvic complications in gonorrhœa under adequate treatment, we should no longer regard pelvic inflammation as a phase of gonorrhœal disease, but rather as a very definitely preventable entity.

#### DEVELOPMENT OF GONOCOCCAL PELVIC INFECTION

Given a patient with active gonorrhœa, how does the disease extend to the pelvis and what is the pathological picture? The factors considered responsible for its spread will be reviewed later.

Primarily gonorrhœa presents in the adult female a picture of urethral and endo-cervical inflammation which passes in every case through the phases of acute and chronic reaction. Because of local tissue reaction to the gonococcus and the development of immunity there is reason to believe that the disease, if subjected to no active interference, tends to be self-limiting, dying out in the majority of such cases, in all probability, in from one to two years. This has been amply illustrated by the results of the majority of conservative pre-sulfonamide methods of treatment.

As a result of certain factors which interfere with this natural curative tendency the purely local urethral and cervical disease extends to involve the tissues of the upper genital tract and pelvic peritoneum. Whether this extension occurs by the surface spread of the infecting gonococeus, or by way of the sub-endometrial and tubal lymphatic network, as suggested by Schlink,<sup>9</sup> is mainly a matter of academic interest. The uterine phase of the infection is not prominent, endometritis tending to be transient due to the cyclic exfoliation of the endometrium; though any extensive pelvic inflammatory involvement must, of necessity, involve the uterus. The pelvic inflammatory picture may be mild or relatively severe in character, though rarely producing the degree of general systemic reaction observed in other infections, such as those due to the streptococcus, pneumococcus, staphylococcus, etc. The pelvic extension, as with the initial urethritis and cervicitis, essentially tends to be localizing in character, the extent of the inflammatory process depending upon the degree of bodily immunity and tissue resistance. Thus it may limit itself in the tube alone; it may involve tube and ovary; or it may produce widespread havoc in which all pelvic tissues suffer by actual bacterial invasion, associated inflam-

matory reaction, or by an adhesive process which results in displacement of structures and subsequent interference with normal vascular supply. In the initial pelvic attack there exists a remarkable tendency toward clinical recovery, not only of structure but of function as well; and often where least expected. At least 50 per cent of primary pelvic gonorrhœal infections resolve completely, or enough to permit normal reproductive function. But with each pelvic inflammatory recurrence the likelihood of restoration of normal structure or function rapidly becomes less and less.

Whereas recurrent Neisserian infections are very largely the result of re-infection or re-extension from the primary cervical focus, the recent findings of Studdiford,<sup>10</sup> based on improved gonococcal cultural methods, cast considerable doubt upon the earlier investigations of Curtis.<sup>3</sup> The latter's work tended to show almost conclusively that in acute salpingitis the gonococci died out in the Fallopian tubes approximately two weeks after the disappearance of fever and leucocytosis. Studdiford found in the Fallopian tubes of 24 patients presenting salpingitis of Neisserian origin, that 16 harboured the organism in spite of the fact that in none, when the tubes were obtained for culture, had the disease lasted less than one month, and in the majority for several months. In 2 cases gonococci were recovered, one in spite of turpentine in oil injections and one following the apparent cure of the local cervical infection by hyperpyrexia. Falk and Weitzner,<sup>4</sup> however, believe that bilateral complete tubal obstruction, either occurring naturally in the course of the gonorrhœal infection, or as surgically produced by them in 112 cases by bilateral resection of the tubal isthmus, is quite effective in the prevention of recurrent disease. They further state that practically every case of primary infection of the tube can be cured if re-infection can be prevented. Nevertheless, in considering the problem of recurrent pelvic inflammatory disease one should bear in mind the possibility of reactivation of gonococci in the Fallopian tubes, as well as definite re-infection from the lower genital tract or secondary infection due to other organisms from bowel or blood-stream.

Until the advent of sulphonamide therapy gonococcal infection has been held responsible for 50 to 70 per cent of all pelvic inflammation. This disabling pelvic condition may develop early or late in relation to the initial lower

genital tract infection. The extension of the inflammatory process would appear to follow certain very definite factors which are theoretically almost entirely preventable. Let us briefly analyze these factors which cause an essentially local disease to invade the tissues of the upper genital tract and pelvic peritoneum.

*Factors responsible for pelvic extension:* factors associated with menstruation; unsatisfactory treatment; expulsion of the fetus at any stage; coitus; surgical interference with the cervix; miscellaneous factors, such as alcoholic excess, physical strain or fatigue, malnutrition, etc.

1. *Factors associated with menstruation.*—Analysis of clinical records shows that almost invariably the spread of the disease follows a menstrual period. Pelvic infection due to the gonococcus is extremely rare before puberty or following the menopause. Rubin states that women who menstruate at infrequent intervals show a lessened incidence of tubal infection. The increased hyperæmia and slight physiological dilatation of the cervix, combined with a more suitable medium (menstrual fluid) for bacterial growth, all favour spread of the infection upward. Of the various factors stated menstruation alone is theoretically unpreventable; but the patient whose pelvis is invaded may have been subjected to other factors of spread, as enumerated above, which in the main are preventable. There is no doubt that the otherwise healthy patient who presents active gonorrhœal urethritis and cervitis, with intelligent care may menstruate with relative safety.

2. *Unsatisfactory treatment.*—This must include treatment which the patient attempts herself, or unwise treatment for which the physician must be held responsible. Active or frequent treatment in the acute and early sub-acute stage of gonorrhœa, especially if it trespasses on the cervical canal, is almost certain to extend the infection upward. The physician, however, is not always to blame, as one theoretically competent authority as late as 1934 actually advised such active treatment as dilating the cervical canal and swabbing out the interior of the uterus with carbolic and alcohol, or tincture of iodine, etc., supposedly to limit the spread of infection. Under this heading also must be classed the use of too frequent or high-pressure douches in acute gonorrhœal cervicitis, the employment of strong antiseptics in douche or tablet form, or other drugs vaginally by the patient with or without

the permission of her doctor, or by the latter himself. One must particularly advise against such treatment especially during or at the conclusion of menstruation. Here as well one must stress the danger of frequent or rough bimanual examinations while the patient is under treatment, or any examination during a menstrual period.

3. *Fetal expulsion at any stage of pregnancy.*—While occasionally unavoidable, every attempt should be made to avoid abortion, miscarriage or premature delivery in the presence of active gonococcal infection in the cervix and urethra. Prenatal cases of gonorrhœa require intelligent therapy for the sake of the child as well as the mother. Intelligent treatment, even if begun late in the pregnancy, carries with it a lessened risk of pelvic infection post partum, or gonorrhœal ophthalmia in the new-born infant. It is well to remember that post-abortal or post partum pelvic infection due to the gonococcus is more virulent in character than that occurring at other times.

4. *Coitus.*—Because of the increase in pelvic vascularity, with greater cervical secretory activity, and variable amounts of trauma caused by sexual intercourse one should rigidly advise against coitus until a cure is established. Even if pelvic extension does not result from this, infection may invade more deeply locally.

5. *Surgical interference with the uterus.*—Active spread of cervical infection during cervical surgery, such as dilatation, cauterization, repair, amputation, etc., and operative procedures involving the body of the uterus in addition to the increased vascularity associated with healing, presents a definite contraindication to uterine or pelvic surgery in the presence of even chronic gonococcal cervicitis. Careful bacteriological examination of cervical discharge in a doubtful or suspicious case posted for operation should eliminate this factor of spread.

6. *Miscellaneous factors.*—Factors such as alcoholic excess, physical strain, fatigue, malnutrition, poor general health from previous or coexistent disease, etc., which increase pelvic vascularity and congestion, lower resistance to infection, may play a part in the extension of Neisserian infection which commonly is quite overlooked.

#### FURTHER CLINICAL CONSIDERATIONS

Time does not permit of other than a few brief statements as to symptomatology and diag-

nostic features. Occurring as stated either early or late in the course of gonorrhoeal infection of the lower genital tract, and almost always developing post-menstrually, the pelvic invasion commonly is ushered in with sharp colicky intermittent lower abdominal pain. This may be quite severe and is followed by or associated with a chill which is rarely severe in character. The pulse is elevated and the temperature usually ranges between 101 to 103°. Nausea and vomiting sometimes accompany the early acute stage but not infrequently may be absent. Marked bilateral abdominal tenderness, with resistance rather than true rigidity, is observed. Rebound tenderness is not unusual and is evidence of the pelvic peritoneal inflammation which exists in almost every case to a greater or lesser extent. Examination reveals exacerbation of purulent vaginal discharge from the cervix, bilateral tenderness, and, later, thickening or well-defined tubal or tubo-ovarian masses. The leucocyte count commonly reaches 20,000 and the sedimentation time drops to 20 to 30 minutes (Linzenmeyer method).

In mild cases the pelvic picture rarely goes beyond moderate tubal thickening with fever, abdominal and pelvic tenderness, subsiding after a few days. In more severe instances fever is prolonged from 7 to 10 days, with definite mass formation, the development of "pus tubes" or a more centralized intraperitoneal abscess. The picture in recurrent attacks of gonococcal pelvic inflammation is quite similar.

The differential diagnosis calls for exclusion of acute appendicitis, ectopic pregnancy, haemorrhage following a ruptured Graafian follicle, post-abortal pelvic infection, torsion of a pelvic tumour, cystic or solid uterine or ovarian in origin, endometriosis, etc. Because of the necessity of abdominal surgery in most of these and not in gonorrhoeal salpingitis a careful eliminative diagnosis is essential.

#### TREATMENT

The past century has witnessed a swinging trend in treatment. Initial conservatism was swept away by the ultra-radicalism of the early aseptic and antiseptic surgical era, to be restored once more to the safety of ultra-conservatism during the past 30 years. Even at present our feeling is that 20 per cent or less of all cases of salpingitis, initial or recurrent, require abdominal surgery. There exists almost a certainty that within another decade this per-

centage will be halved by modern or improved therapeutic methods. So often the economic factor has determined the treatment to be employed. This is wrong. Too frequently surgery has been employed with the excuse of saving time and reducing the economic drain. As Randall<sup>8</sup> has pointed out, the total cost of hospitalization and surgical treatment in Neisserian pelvic disease probably differs very little from the cost of adequate non-surgical treatment of the initial attack. Providing the patient has sufficient intelligence to understand the seriousness of a situation which may lead readily to genital dysfunction, her co-operation during treatment should be secured without difficulty. Certainly lack of her co-operation points the way to repeated attacks; and, in turn, this downward path almost inevitably leads to operation. We should be guided by three fundamentals of conservatism in the treatment of primary pelvic gonococcal infection: to conserve and increase the natural bodily defenses against infection; to obtain as quickly as is compatible with safety the most efficient pelvic localization in the least tissue; and, finally, to ensure that the patient is left with the least possible residual damage.

Experience has indicated the value of certain basic features of treatment, such as complete rest, Fowler's position, quiet, adequate simple sedatives, readily digestible nourishment, copious fluid intake, and the avoidance of other than simple laxatives or enemas. The utilization of heat is beyond criticism as a therapeutic adjunct. It relieves pain, stimulates local hyperæmia and leucocytic response. Heat may be employed in various ways—abdominally, by the use of the electric cradle, or frequent hot linseed poultices—pelvically, by prolonged low-pressure hot (110°) douches, Elliott therapy, and by diathermy. All possess merit. Fever therapy has many advocates, though relatively limited in usefulness to large hospital centres. It is not without risk. Pelvic infections due to strains of gonococci resistant to sulphonamide therapy have been stated to respond to it. The injection of foreign proteins, such as sterile defatted milk, typhoid vaccine, etc., causes systemic febrile reaction and appears to stimulate body resistance.

Of all the sulphonamide compounds so far introduced sulfapyridine would seem to be the most useful. As with all the members of this class of drugs its action most likely is entirely bacteriostatic; which action assists the natural bactericidal defence of the body by reducing the

extent of bacterial attack. Its effectiveness is dependent upon an efficient pelvic blood supply, congestion due to structural displacement and adhesions limiting its usefulness. Where possible it should be administered under intelligent supervision to suitable cases in sufficient dosage to maintain a blood level of 7 to 10 mg. per cent for 5 to 7 days; being reduced gradually so as to give a total of at least 7 and preferably 10 days' treatment. Among other contraindications patients who exhibit severe anaemia or poor leucocytic response at the onset of their infection should not receive the drug unless their condition is improved by one or more transfusions. In the absence of severe nausea or vomiting one gram four times a day, combined with an equal amount of soda may be given; preferably it should not be administered on an empty stomach. If well tolerated this dose should be continued for five days with a gradual reduction in dosage over the next five days. Where a satisfactory response is obtained all the acute symptoms should begin to subside, and with definite increase in the speed and degree of resolution of the pelvic inflammatory process.

Where the drug cannot be tolerated by mouth it may be given in its soluble form intravenously in 1 gram amounts, three to four times a day, in conjunction with intravenous saline. It should be administered for five days if a satisfactory response is elicited; then with subsequent gradual reduction in dosage over the following 3 to 5 days. With general improvement, however, the patient may be able to resume the drug orally, after a few days of intravenous treatment.

Sulphonamide therapy unquestionably represents a distinctive advance over all previous methods of treatment, but never should be used to the exclusion of all other therapeutic measures, preferably in conjunction with them. Experience has shown that sulphonamides are of little value once a definite "pus tube" or a pelvic abscess has developed. It is obvious that, whatever the treatment, care should be taken to eradicate the cervical infection from which reinvasion of pelvic tissue may occur.

Surgery, other than posterior colpotomy for the drainage of accessible and well developed tubo-ovarian and pelvic abscesses, should be reserved for the correction or elimination of the sequelæ of infection—never for the infection itself. No case of primary pelvic infection should be operated on except for the results of

a widespread destructive inflammatory process; and preferably never under less than one year of observation. In recurrent pelvic infection operation is reserved for those cases presenting definite residual disease and disabling symptoms, especially in older patients not responding to medical treatment, or in whom the infection is associated with other pelvic disease such as fibroids. In many cases removal of the uterus tubes and ovaries ensures the most satisfactory results. Conservative surgery, where absolute certainty exists as to the quiescence of the inflammatory picture, must be considered in younger patients. Here one should remove only permanently functionless tissue or correct sequelæ of infection such as displacement and adhesions, causing pain and menstrual dysfunction, etc.

Even though the degree of relief may not be complete in all cases with conservative surgery, in younger individuals the psychological fear of loss of sex-feeling, the elimination of all hope of reproduction, with menopausal symptoms and mental depression, may be much more worrisome than variable amounts of residual pain. This indeed should colour one's attitude toward the surgery of the sequelæ of Neisserian pelvic disease at any age.

#### CONCLUSIONS

1. With adequate modern gonorrhoeal therapy, including the use of sulfapyridine, the incidence of pelvic infection has been and should continue to be reduced.
2. Gonococcal infection, whether in urethra and cervix or in the upper pelvic tissues, tends to become localized and self-limited; it presents a remarkable tendency to resolve, often completely.
3. Pelvic invasion of the gonococcus would appear to be governed by certain factors preventable in the main, and which may be held responsible for its spread.
4. Practically all initial attacks of gonococcal pelvic infection clinically tend to recover completely if recurrence can be prevented.
5. Sulfapyridine therapy would appear to be of considerable value in limiting the extent and duration of pelvic infection.
6. Surgical treatment, except for posterior colpotomy, should be reserved for the recurrent case, and then for the treatment of the sequelæ of the infection rather than the infection itself.

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## BENIGN LESIONS OF THE CERVIX\*

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THERE is a tendency amongst the profession as well as the laity to treat the common lesions of the cervix all too casually. The average woman will put up with considerable discharge and discomfort before consulting a doctor and the physician is apt to take her at her word and dismiss her without careful examination. As a result of this attitude an occasional serious lesion is overlooked. While it is true that this paper deals with benign lesions of the cervix, it would be wrong not to emphasize that these cases should always be approached with a view to establishing or ruling out malignant disease. The symptoms at times can be confusing, and only by careful examination with frequent resort to biopsy can the doctor measure up to his responsibility and assure an early diagnosis in those cases where it is possible and where it is so important. While it might be wrong to state with assurance that cervical lesions are precursors of cancer, we must face the fact that most cancer of the uterus occurs in the cervix, chiefly in parous women, and on this basis alone it would seem advisable to maintain the cervix in as healthy a state as possible.

It would be well also to bear in mind that the cervix is not a separate organ but only a part of the uterus. Though differing from the body in structure and function, it is unreasonable to suppose that a part of an organ can be diseased and not affect the function of the whole, and if normal function is to be maintained the whole uterus including the cervix must be in a healthy state.

The benign lesions of the cervix fall into three groups — those due to inflammatory changes;

those due to trauma; and those due to new growth.

*Inflammatory changes.*—These are the result of either direct infection of the cervix, as in gonorrhœa, or of infection superimposed on an already injured cervix, though the injury itself may be slight. The resulting condition is a catarrhal cervix which is usually made up of chronic inflammatory disease of the canal and of the vaginal portion of the cervix—endo- and exo-cervicitis. These lesions in themselves are distinct and different, although it is the exception to find a case where one is present without the other. Nevertheless, this must be understood as the treatment used will depend on which type dominates the picture.

*Endocervicitis* is a chronic infection of the cervical mucosa, which is secondary to an acute infection such as gonorrhœa or to trauma. Gonorrhœal cervicitis does not concern us in this paper, other than to state that secondarily infecting organisms invade the endocervix following acute gonorrhœal cervicitis, and even if the gonococcus dies out endocervicitis remains and as such will require treatment in most cases. In the ordinary endocervicitis the underlying cause is chronic inflammation set up by bacteria which gain their entrance through the lacerations which may occur during the termination of pregnancy, at term or earlier. This inflammatory reaction involves the whole of the mucosa, including the glands, but does not extend beneath it, nor does it extend more than one-third to one-half up the cervical canal. The characteristic symptom of the disease is thick mucoid discharge, sometimes purulent and sometimes clear, poured out by the glands under these conditions.

*Exocervicitis.*—The development of exocervicitis is entirely different. Following injury to

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the squamous cell epithelium covering the vaginal portion of the cervix the columnar epithelium lining the cervical canal a more rapidly growing type spreads down over the injured surface, and, not being resistant to the vaginal secretions and bacterial flora, becomes secondarily infected in varying degrees. This may take place around a more or less intact os or over the surface of laceration. Here and there over the surface there may be ulcerated areas to which the term erosion may be correctly applied. This presents a surface lesion, secreting a thin, purulent, often irritating discharge. In some cases the squamous epithelium attempts to grow in from the edges and in the process plugs some of the glands which continue to secrete mucus forming retention cysts or Nabothian follicles. Metaplasia of the cervical epithelium may also be noted in some areas. The presence of a large number of cysts constitutes what is spoken of as cystic disease of the cervix.

There is one other type of cervicitis, that occurring in the young virgin. This is chiefly an exocervicitis with the same pathological picture, and is thought to be due to injury to the squamous cells around the os which at puberty are less resistant or in some cases to an ill-defined edge between the two types of mucosa, and a spreading out of the columnar epithelium from there.

Before going on to the treatment, I would like to stress again that many of the cervices in their symptomatology and appearance are hard to distinguish from early cancer. The Schiller test is of value only to those who have had considerable experience with it, and even then is not conclusive. The only sure way to relieve suspicion is to do a biopsy through the suspected area, including some normal tissue and large enough to let the pathologist make a definite diagnosis.

It has been stated that the trauma to the cervix during abortions or delivery is the underlying cause of catarrhal cervix, and here a plea is instituted for post-partum examination and treatment. If this were done much of the cervical disease seen in the forties would not be present. There is one point I would like to make in this regard. Experience has shown that six weeks post partum is too soon to start local treatment. Eight to nine weeks is soon enough as much healing takes place in the intervals and if

cleansing douches are used a smaller area will have to be dealt with.

When a patient presents herself for treatment of a catarrhal cervix the physician must decide whether satisfactory treatment can be carried out in the office or if more radical treatment is required. This decision should be based on the character and extent of the lesion and a full knowledge of the limitations of the means at his disposal. There is nothing quite so unsatisfactory for both the patient and the doctor as treatment extending over weeks with very little apparent result, and this so frequently happens where office treatment is undertaken in unsuitable cases.

The use of 20 per cent silver nitrate is only applicable to small areas of exocervicitis, for its effect is most superficial and contact with mucus nullifies its action. Consequently, it should not be used in cases where endocervicitis predominates or where the exocervicitis is more than one inch in diameter. It should be accompanied by astringent douches and is most valuable in treating exocervicitis post partum where the lesion is small.

The office cautery is in much the same category. It was introduced some years ago and received with enthusiasm. Unfortunately, our experience with it has been rather disappointing. It is useful in the post-partum cases and where there is not much endocervicitis, or too large an area of exocervicitis. True, by this method one can treat slightly more extensive lesions than with silver nitrate, but it also has disadvantages. Many patients find it painful, and even light cauterization will sometimes produce a secondary haemorrhage which may require packing. This, though not serious, is always disturbing both for the doctor and the patient.

Cauterization of small areas of the cervix is carried out weekly and douches are administered in the interval. The time required to complete the treatment is very little less than with silver nitrate and the scope is very little greater.

It will be seen then that where the lesion is at all extensive or the treatment seems likely to be prolonged the writer leans to more radical measures. Quick and satisfactory results are gratifying, and operative treatment always provides the opportunity for biopsy in the suspicious case. Care should be taken to select the time immediately following the period for vaginal operations, as it provides the maximum time for

healing before the congestion attendant on menstruation begins again. Several methods are available.

*Coning operation or Sturmdorff trachelorrhaphy.*—The removal of a cone of tissue, the base at the outside edge of exocervicitis and the apex the endocervix high enough to remove all diseased tissue. The anterior and posterior lips are turned up and sewn in the apex of the wound to make a new os. Only applicable where the lesion is circumscribed and where there is no lateral laceration. Admittedly, our experience with this operation is not great as it has been done infrequently here, partly because of unsatisfactory results and also because of the more general use of deep cautery. The operation fails because healing is unsatisfactory and if this occurs the end result is worse than the start.

*Bovey knife or cautery knife.*—The same type of coning operation is done, but no attempt is made at reconstruction. The area of exocervicitis must therefore be small. The results claimed are good, but we have had no experience with this method as it has not been used on our service.

*Actual cautery under anaesthesia.*—In our hands this has been by far the most satisfactory method of treating the catarrhal cervix where the lesion is of any extent. Care must be taken with the technique if the maximum result is to be obtained. The usual vaginal preparation is carried out and the cervix dilated to a 10 or 12 Hegar. If there is eversion rather deep lines are made with the cautery radiating from the cervical canal about one-half an inch apart. All Nabothian follicles are destroyed with the tip of the cautery, as is the mucous membrane of the canal, to the top of the diseased area. The mucosa between these radiating lines is now cauterized lightly with dull heat. The cervix is packed with iodoform gauze for forty-eight hours, and the patient kept in bed four to five days and her activity restricted for about two weeks. It is always well to warn patients treated in this manner that the discharge will be worse at first and will not disappear until the cervix is entirely healed, a period of three to four weeks. They should also be cautioned with regard to secondary haemorrhage, which occasionally occurs at about ten to twelve days. It is rarely alarming and can always be controlled by packing. After the first ten days a daily cleansing douche is helpful if there has been no bleeding.

This procedure is not carried out at the time of curettage for incomplete abortion because of the danger of infection. With this exclusion, 513 patients were operated on in the gynaecological service at the Toronto General Hospital in 1939, of whom 111 had their cervices cauterized, either as part of a double operation or as a separate procedure. The complications have been few and the results excellent. Infection is rare and secondary haemorrhage in significant amounts is not very frequent and can easily be controlled by packing. Subsequent atresia of the cervix has been pointed out as one of the great drawbacks of this procedure. Its occurrence is much less common than one would suppose. In the above series there was none and from July, 1936, to December, 1939, a period of three and a half years, were only two. When it does occur, it is usually superficial and can be dealt with by the introduction of a sound. This complication should not be over-emphasized and in no way detracts from the value of the operation.

To complete the infections of the cervix, tuberculosis and syphilis should be mentioned. Tuberculosis is rare and usually is secondary to a lesion higher up the genital tract. The diagnosis is a microscopic one. Primary syphilis of the cervix occurs in a small percentage of genital syphilis and is not typical in appearance. It is usually grafted on an erosion or catarrhal area and is diagnosed by means of the dark field.

The lesions of the cervix directly due to trauma are of two types. Those produced by assaults on the cervix to bring about an abortion, and those following delivery, either spontaneous or operative. Of the various injuries due to the former, only the introduction of potassium permanganate tablets will be discussed. It is comparatively new as an abortifacient, and its popularity lies in its power to invariably produce bleeding, in spite of the fact that this bleeding seldom leads to an abortion but often to a critical condition of the patient. In the last three years 20 cases of potassium permanganate ulceration have been admitted to the wards. Six had to be transfused and two others given an intravenous injection of glucose, giving some idea of the importance and frequency of the haemorrhage.

The tablet is introduced high up in the vagina and a chemical ulcer is formed, wherever it touches. The amount of bleeding depends on the depth and the size of the vessel eroded. It may be very profuse if a large vessel is opened.

The lesion itself is easily recognized on the introduction of a speculum. Characteristically, there are two ulcers, one on the vaginal wall and one on the cervix. They are rather deeply punched out and brownish gray in colour. The bleeding can usually be controlled temporarily by packing, but healing is slow and recurrent haemorrhages often take place on removing the packing. Where this occurs, or where definite arteries are seen spouting, the best treatment is to oversew the ulcer under an anaesthetic. In these cases there may be rather marked residual scarring of the vault. Abortion seldom occurs and when it does is probably due to the manipulation required to stop the haemorrhage.

Lacerations of the cervix may occur during spontaneous delivery, and because the cervix is not examined go unrecognized. The inspection of all cervices is not advocated but when there is a persistent trickle of blood after completion of the third stage with a well contracted uterus, or where an operative delivery has been carried out before the cervix is entirely effaced, it should be suspected and ruled out by careful examination. If present, it should be repaired immediately. While it is true that a laceration observed at the time of delivery will appear very much less significant when involution is complete, it is also true that much of the disability that calls for treatment later might have been avoided if repair had been carried out at the time.

The chronic lacerations are usually associated with cervicitis, cystic disease, and hypertrophy, producing dragging pelvic pain, discharge, menstrual dysfunction, and if the tear extends to the internal os, repeated abortions. The pelvic pain is difficult to describe. It is not acute, more gnawing in character, the patient being constantly conscious of her pelvis. When the condition is relieved there is a marked sense of well being and an improvement in general health. While this is undoubtedly true, the disability is a local one and the cervix does not appear to be a focus of infection in the same sense as teeth and tonsils are in their relation to such diseases as arthritis. The treatment of such a lesion is undertaken then to remove an unhealthy area, to relieve the local symptoms and improve the general health.

The procedure selected will depend on the type of lesion. Some type of cutting operation must be done. Cystic disease contraindicates plastic surgery as does much hypertrophy of one or both lips. Under these conditions, an amputation above the diseased portion of the cervix is

done. This also applies to stellate lacerations or where it is impossible to reconstruct the cervix. If the laceration is unilateral or bilateral with eversion the Emmett trachelorrhaphy is best. In our experience it has been most satisfactory and few failures have been recorded. Where the vault of the vagina is involved and much scarring is present, particularly if this is associated with pain and menstrual irregularity, vaginal procedures are of little value and experience has shown that total hysterectomy is the most satisfactory cure.

Benign new growths are represented by the cervical polypus whose chief importance lies in the diagnosis. It produces discharge and intermenstrual bleeding symptoms very suggestive of malignant disease. It is always with a sense of relief that examination reveals a polypus. The lesion is an outgrowth from the endocervix, very vascular, and showing characteristic columnar epithelium and glandular elements in a fibrous tissue stroma. It is pedunculated and easily removed by torsion or cutting the pedicle. The base should then be cauterized. Every polypus should be examined pathologically, as very occasionally one will show malignant change in the base.

#### CONCLUSIONS

1. The lesions of the cervix should be taken seriously, treated carefully, and vigilance with regard to malignancy should never be relaxed.
2. Cauterization of the cervix under anaesthesia is the best treatment for catarrhal cervix, except in very minor cases where silver nitrate and the office cautery may be used. Complications of the procedure are relatively unimportant.
3. The possibility of potassium permanganate ulceration must not be overlooked in abortions with profuse haemorrhage, and prompt treatment instituted.
4. In deliveries where laceration of the cervix may be suspected the cervix should be carefully examined and immediate repair carried out.
5. Amputation of the cervix is the best procedure where much hypertrophy or cystic disease is present.
6. In certain cases with lacerations and scarring extending into the vault, accompanied by lower abdominal pain, total hysterectomy is the operation of choice.
7. Pathological examination of all cervical polypi is advocated, as a few show malignant changes in the base.

## PYELONEPHRITIS OF PREGNANCY\*

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THE female urinary system assumes a rôle of major importance during pregnancy. The additional strain placed upon it and the many variations to which it is subjected tend to lower its resistance to disease and infection.

This paper is limited to a discussion of the condition now referred to as pyelonephritis of pregnancy, a name much to be preferred to the old name of pyelitis of pregnancy, as seldom if ever is the inflammatory process limited to the renal pelvis alone.

Infections of the urinary tract are quite common during pregnancy. The vast majority of these respond readily to medical and postural treatment by the attending physician. Pyelonephritis of pregnancy when referred to the urologist is an emergency requiring precise diagnosis and prompt treatment, as the lives and well being of two individuals are at stake. The condition in itself is seldom fatal, but results in grave illness with possible permanent renal damage to the mother, and the loss of her baby by premature labour, if the disease is not promptly and efficiently treated. The results of appropriate treatment in many cases border on the spectacular.

Pyelonephritis of pregnancy, as urologists see it, is not a frequent condition. Consequently each writer on the subject, has only a small series of personal cases to report upon.

There have been several good discussions in the literature recently on this condition. The most recent Canadian study was by Hall and Foulds.<sup>1</sup> Other interesting articles are those by Geisinger,<sup>2</sup> Sugar,<sup>3</sup> and by Dieckmann and Brown<sup>4</sup> while an excellent statistical study is that of Abeshouse, Linas and Kolman.<sup>5</sup>

My observations are based upon a series of 19 cases referred to me during the years of 1927 to 1939. So far as I can ascertain there was only one other case in our area during that time. The authorities report during those years the registration of 15,477 births. The

incidence of the infection is therefore much lower than many report.

During these twelve years there have been many changes and advances in the treatment of renal infections. Therefore the summaries of a few case histories are in order, so that we may orient ourselves for a discussion of the problem.

## CASE 1

Mrs. C., aged 21. First seen in December, 1927, with a history of intermittent frequency since having had an induction for so-called pyelitis of pregnancy one year previous. She was seen twice and records show considerable improvement under medication. She was not seen again until August, 1928, when she was seven months' pregnant.

She had pain and frequency and was markedly anaemic. On August 22nd, she was cystoscoped, the bladder was much inflamed and the ureteral orifices were hard to find. The right ureter was located and was catheterized with difficulty, urine was under marked tension. The pelvis was irrigated until return flow was clear and 5 c.c. of neosilvol was instilled into the pelvis. The catheter was left in the ureter. Saline was instilled morning and night for two days when the catheter was removed. She was given potassium citrate gr. xx four times daily and iron. This was followed by urotropin. She had her baby without difficulty on October 15th. As there was still pus in the urine neo silvol was again instilled into the right pelvis before she left the hospital.

Seen recently, six later pregnancies are reported without another kidney flare-up.

## CASE 2

Mrs. S., aged 19. Referred by Dr. J. C. Gillie. Admitted to hospital early in morning of January 18, 1936, in her first labour. There was a history of frequency of urination for last three months. Labour was slow, and on the 20th after an episiotomy there was a low forceps delivery of a living child. There was slight haemorrhage and she was given scarlet fever antitoxin. The next day there were severe chills and she was started on potassium citrate gr. xx every four hours. There was right-sided pain and pus in the urine. Culture of urine on the 25th showed *B. coli* and following further exacerbation of symptoms on the 26th she was cystoscoped. There was moderate trigonitis with a small right ureteral orifice. An F6 catheter was passed. The pelvis was lavaged until the return was clear and 5 c.c. of 5 per cent neosilvol were instilled. Culture report from right kidney was pure *B. coli*. Saline was injected into the catheter every three hours for 24 hours and catheter removed. There was no further elevation of temperature. She was out of bed on the 30th and discharged on the 31st and hexamine was prescribed. She has not reported for further check-up.

## CASE 3

Mrs. L., aged 19. Referred by Dr. McCartney. Seen on January 25, 1938, at 4½ months during her first pregnancy, pain in right side with frequency and fever. The mother stated that patient had had weak kidneys as a girl and often complained of right-sided pain. Urine

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showed much pus and colon bacillus on culture. On January 26th she was cystoscoped. The cystoscope was passed easily but it was hard to get fluid into the bladder. The right ureter was catheterized, urine was under tension. Pyelogram No. 1 was made with 10 c.c. of sodium iodide as a medium. This showed markedly dilated pelvis and ureter. The pelvis was lavaged until the return was clear. The catheter was left in the ureter. Saline was injected every hour for the first day and every three hours the second day. The culture showed colon bacillus and she was given mandams. On February 3rd the ureter was dilated to F10. On April 20th there was flare-up with pain and frequency which responded to medication. She had her baby in May without trouble.

She was seen again on July 15, 1939, when eight and a half months in her second pregnancy. There was intense pain on the right side. She was cystoscoped and there was slight congestion noted in the bladder. An unsuccessful attempt was made to pass an F8 catheter. An F6 was finally passed and the urine was under great tension. The pelvis was lavaged and the catheter was left in the ureter. The patient remarked on the great release from pain. Saline was injected every hour. She went into labour and had her baby early in the morning of the 17th. She had a stormy twelve hours after delivery with irregular pulse and later a chill. Urine cultures showed presence of *Bacillus aerogenes* and non-haemolytic streptococcus. She was given prontylin, 7½ gr. every 4 hours, and iron therapy added. Her progress was uninterrupted. On July 26th she was cystoscoped. There was very little sign of inflammation. Both ureters were catheterized easily. Indigo-carmine was injected intravenously and appeared in the left side in 8½ minutes and the right in 10 minutes. A double pyelogram was made, using 20 c.c. on the right side and 10 c.c. on the left. Cultures were all negative. The pyelogram No. 2 showed a markedly dilated and tortuous right ureter with dilatation of the pelvis and calyces. There was some dilatation of the left but it was not so marked. She was seen on August 25, 1939, her symptoms were negative except for a little tenderness over the right kidney on deep palpation. Her urine was negative on culture.

#### CASE 4

Mrs. S., aged 23. Referred by Dr. J. W. Cook. Seven months' pregnant, history of four miscarriages cause unknown. Ill at home in country for some time without care. On June 14, 1938, Dr. Cook was called and brought her to hospital. There were pains as if she was going into labour, these had quieted down by next day and there was indefinite pain in the back. She was given potassium citrate. During the 17th she had several chills with pain in the back with considerable pus in the urine. That night temperature rose to 107° F. She was cystoscoped at the height of the fever. There was only moderate congestion in the bladder. Both ureters were catheterized. The tension was increased on both sides but was more marked on the right. Both sides were lavaged until the return was clear. The catheters were left in the ureters and 5 c.c. of normal saline were injected into each catheter every hour for first 24 hours then every three hours. Potassium citrate was given in 30-grain doses every three hours. The catheters were removed on the 21st. The culture reports showed colon bacillus in both right and left specimens. On the 23rd medication was changed to prontylin gr. x three times daily. She left hospital on the 28th with a normal temperature. In August she returned to hospital and had her baby without trouble. Culture of urine was still positive and prontylin was prescribed. She returned to hospital a year later for another baby, again without prenatal care. Culture of the urine at this time was negative.

#### CASE 5

Mrs. B., aged 23, primipara, 5 months' pregnant. Referred by Dr. McLeod. Admitted to hospital on the evening of October 21, 1938, with history of complete well being until three days previous when she had a chill

followed by nausea and vomiting. There were elevated temperature and right sided pain but no urinary symptoms. On the morning of admission, she suddenly developed upper abdominal distension, which became worse during the day. On admission, blood pressure 115/50; white blood cells, 21,400; urine, specific gravity, 1.022, trace of albumin, approximately 3 white blood cells and 2 red blood cells per high power field. She was given 1,100 c.c. intravenous glucose in saline. In the morning there was increased distension and the only localizing sign was a deep tenderness on palpation in right renal region. Cystoscopy showed some congestion in the bladder. An F6 catheter was passed up the right ureter, urine was under tension, 40 c.c. being recovered in a few minutes. There was immediate lessening of abdominal pain. The pelvis was irrigated several times with a saline solution and the catheter left in the ureter. Five c.c. of normal saline were injected into the catheter every hour for 24 hours and then every three hours for next 24 hours when the catheter was removed. Cultures showed colon bacillus. She was given two mandam tablets after meals. There was rapid disappearance of all symptoms. Urine culture was still positive on October 27th. On October 30th she was cystoscoped, there was very little evidence of bladder inflammation. An F10 dilating bougie was passed up the right ureter and 5 c.c. of 5 per cent neosilvol were instilled in the right pelvis through a catheter.

She was discharged on November 1st. There were no urinary symptoms. Mandelic acid therapy was kept up with mandams. Culture was positive on November 11th but negative on November 30th. She had her baby in February without trouble and recently reported she had had no illness of any kind since.

#### STATISTICS

My statistics may be very briefly summarized. There were 8 primiparae and 11 multiparae; five of the multiparae were undergoing their fourth pregnancy. *Recurrences.* — One patient was treated during her first and second pregnancy; no other recurrences were found although several had other pregnancies without difficulty. *Age.* — The ages of patients varied from 18 to 33. *Period during pregnancy.* — Fourteen were in their second trimester, three in the third, while two were post-partum. *Season.* — There was no seasonal preference, cases were encountered in practically every month of the year. *Symptoms.* — Pain and fever were universally present, frequency of urination was not an outstanding complaint, definite chills were recorded in nearly every history, symptoms predominated in the right side in thirteen cases in the left side in two and were about equal in four. *Bacteriology.* Colon bacilli were present in every case and in one non-haemolytic streptococci were also isolated on culture. Wherever the non-offending side was catheterized colon bacilli were also found on culture in the urine from that ureter.

#### TREATMENT

As outlined in the cases presented various forms of drug therapy were used throughout these years. The newer drugs were utilized, as their usefulness in the treatment of urinary

infections was recognized. The earlier cases were given potassium citrate in 20 and 30-grain doses during the acute stage, followed by hexamine for a considerable time. In later cases the various forms of mandelic acid therapy were used and in some cases sulfanilamide. At present my preference is for mandelic acid in the form of ammonium mandelate, although we must remember that hexamine is still our most useful drug for clearing up residual infection, especially when used with an acidifier, of which ammonium chloride is the most satisfactory.

In pyelonephritis, such as we are considering, the most valuable part of the treatment is the insertion of an indwelling ureteral catheter. There is no contra-indication to its use and no reason for delay once the failure of the usual medical and postural means of treatment is demonstrated. In fact, in severe cases, the catheter should be passed without delay. In spite of the pregnancy cystoscopic examination is not usually difficult. The cystoscope will enter the bladder with ease. If the fetal head is low down there may be some difficulty in getting enough fluid into the bladder to work freely. This is overcome by lowering the head of the examining table. The bladder in the pregnant woman is considerably distorted and the usual landmarks are ironed out. Seng<sup>6</sup> describes this distortion "as a lengthening of the vesicle trigone from the urethro-vesicle orifice to the inter-ureteric ridge and a broadening of the base of the triangle so that in many cases the ureteral orifices are really farther apart than in the bladder of the non-pregnant woman". In my experience I have found that the ureteral orifices are much nearer the lateral walls during pregnancy than in the non-pregnant woman. As the urethra seems quite lax this does not make catheterization of the ureters any more difficult.

In my series I found no trace of a residuum in any bladder.

In spite of the severity of the infection the bladder often shows little evidence of inflammatory reaction and the orifices are usually fairly easily located. However in two of my cases there was so much bladder involvement that I could not find the orifices.

As the catheter is passed up the ureter one is surprised at the rapid flow of urine through the catheter showing the degree of tension in the pelvis and ureter. As no anaesthetic is used

during the instrumentation it is not unusual to have the patient remark upon the rapid easing of the pain in her loin. The pelvis is lavaged through the catheter with saline solution until the return flow is clear. Formerly it was considered necessary to instil silver nitrate or some other solution into the pelvis, now it is felt that adequate drainage is sufficient. This means that the catheter must be kept patent. This is done by having the nurse inject and withdraw 5 c.c. of saline solution every hour the first day and then every three hours as long as the catheter is in the ureter. The catheter is usually left in the ureter 48 hours but may be left in place longer if indicated.

#### RESULTS

All the mothers in this series recovered; 17 living babies were born. There were no therapeutic inductions. There were two premature labours with dead babies; one of these was one of the two that I could not catheterize, the other miscarried two days after cystoscopic manipulation when her symptoms had practically disappeared. My results and studies, therefore, coincide with the more recent reports. In fact there is now almost a unanimity of opinion as to the indications for and the results obtained by catheter drainage in pyelonephritis of pregnancy.

#### DISCUSSION

There is, however, still a very wide divergence of opinion as to the reason why this condition develops. It is true that about half the cases give a history of previous renal infection, but in some of the others the condition develops with dramatic suddenness.

All writers are agreed that there is a considerable dilatation of the pelvis and ureters in all pregnant women, starting early in pregnancy and resolving rapidly in the puerperium. Seng<sup>6</sup> after a very intensive study summarizes his findings as follows "Every pregnant woman has, at some time during her pregnancy, a varying degree of dilatation of one or both ureters and renal pelvis. Dilatation may begin as early as the sixth week and usually reaches its maximum between the twenty-second and twenty-fourth weeks of pregnancy. It is never enormous unless associated with disease. At about the twentieth week there begins an associated demonstrable stasis which persists throughout the rest of the pregnancy but varies

in intensity, not so much according to the period of the pregnancy as to the reaction of the individual woman."

There are many theories as to why this dilatation develops, being all the way from increased blood supply to pressure from the gravid uterus.

Naturally, with dilated ureters there is a resultant stasis in the urinary tract. Constipation is a very common condition in the pregnant woman; this allows for a greater accumulation of colon bacilli in the digestive tract. The entry of colon bacilli to the urinary system by the haemogenous route is comparatively easy.

We have here the four factors of constipation, colon bacilli, dilatation of the ureters and stasis. This would seem to be a reasonable explanation of our problem, but is it? In view of the fact that three of the factors, ureteral dilatation, stasis and constipation are universally present and that various studies in the pregnant woman has shown the presence of the colon bacillus in the urine in from 40 to 60 per cent of these cases without symptoms, should we not consider these factors as physiological and look for some other explanation of pyelonephritis of pregnancy?

In spite of the large number of clinical studies of this condition I am impressed with the scarcity of studies in the lower ureter. The only reference I have found is to the work of Hofbauer<sup>7</sup> who is reported to have found definite hyperplastic and hypertrophic changes both in the musculature and in the connective tissue of the lower ureter.

The location of the lower ureter makes it very susceptible to any changes in the surrounding tissues. During pregnancy these tissues have a greatly increased blood supply and connective-tissue development. These with the above referred to changes in the ureteral walls will all have a tendency to convert this portion of the ureter into a non-yielding tube. This feeling is borne out by the findings that in all pyelograms the lower ureter does not participate in the otherwise universal dilatation.

Is it not reasonable to suppose that the progressive action of this connective tissue in the lower ureter, when associated with some systemic upset such as exposure to cold or dampness or some digestive indiscretion, is enough to cause a temporary obstruction to the ureter?

This obstruction on top of the already present dilatation, stasis and bacilli can cause the symptoms of this disease.

In my opinion we should look to the lower ureter for an explanation as to why a certain number of parturient women develop pyelonephritis of pregnancy. In support of this theory there are the following: (a) The cystoscopic findings of pyelonephritis of pregnancy do not as a rule show the same degree of vesicle involvement as an ordinary pyelonephritis. (b) We know that the treatment of pyelonephritis of pregnancy is essentially a matter of drainage, and that that drainage is secured by the passage of a ureteral catheter. (c) We know that as soon as the catheter passes through the lower segment of the ureter we obtain urine under tension and that with the release of this tension the patient gets release of pain. (d) In many cases the catheter will enter the ureteral meatus easily enough but there is often difficult manipulation to get the catheter through the lower part of the ureter. (e) Even after treatment and with freedom from pain and other symptoms the ureteral dilatation persists until after childbirth and the colon bacilli are not eradicated until that time.

Histological studies of this area of the ureter in the pregnant woman should give a lead towards a solution of our problem. Pyelonephritis of pregnancy being so rarely fatal, the opportunities for study will be few. With the lack of these histological studies one hesitates to use the term ureteral stricture. However, I feel that we should consider the term here in its broadest sense, because we are dealing with a condition which suddenly results in a partial obstruction to an already overburdened section of the ureter.

Acting on this presumption in my last few cases, after waiting until temperature has been normal for a few days, I have passed a dilating bougie, size No. 10, up the ureter, using evipal anaesthesia. I have seen no bad effects and it gives a much greater feeling of security for the remainder of the pregnancy.

One note of warning; even the most gently ureteral catheterization during the last month of pregnancy may be enough to stimulate labour. I had it happen in one of the cases referred to me in this series presented to-day and have had it happen in other investigations

associated with pregnancy. It is no contraindication for catheterization, because a successful labour at this stage is usually fairly easy on the mother and has resulted in each case in a living child. It is just another indication of the close relationship existing between the lower ureter and the cervix.

#### SUMMARY

1. There is general agreement on the clinical and bacteriological findings and on the treatment of pyelonephritis of pregnancy.

2. The suggestion is made that the further histological studies of the lower ureter may

result in a reasonable explanation of why this condition develops.

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### KIDNEY TUMOURS\*

(AN ANALYSIS OF A SERIES OF 118 CASES)

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THE purpose of this communication is to present an analysis of the cases of renal tumour that have been treated in our Service during the past 20 years. There have been 118 cases diagnosed renal tumour out of 18,000 admissions, and of these 21 were classified as benign, and 97 were malignant.

#### BENIGN TUMOURS

Of the 21 benign tumours 20 were operated upon and one was not. The pathological reports from operations were:

Solitary cyst .....	8
Multiple cysts .....	2
Fibroma .....	2
Papilloma and calculi .....	2
Papilloma (pelvis) .....	3
Hæmangioma .....	2
Leiomyoma .....	1

These benign tumours (not including solitary cysts) have no characteristic symptoms which will distinguish them from the malignant growths, hence most of them were diagnosed as benign post-operatively. Some caused no symptoms and were found on routine cystoscopic examination by a filling defect in one or more of the calyces. Certain of the solitary cysts gave no symptoms, and the mass was found on routine physical examination. In the two cases

of papilloma and calculi the papilloma was not diagnosed before operation.

In the cases of hæmangioma the only symptom was persistent bleeding. In one the pyelogram showed a dilated and distorted renal pelvis, while in the other there was persistent bleeding with no apparent alteration of the renal pelvis, nor any evidence of a filling defect in the calyces. There were no adenomas in the series.

These 20 patients were discharged as cured, and have remained so as far as we can ascertain.

#### MALIGNANT TUMOURS

There were 97 cases that came under this heading, of which 62 were proved malignant by operation. Nineteen patients were not operated upon because of metastases; 9 were not operated upon because of their poor physical condition, and 7, who we felt quite sure were malignant cases, refused operation.

The age incidence of these 97 cases was as follows:

0-10 years .....	2
10-20 " .....	2
20-30 " .....	6
30-40 " .....	4
40-50 " .....	22
50-60 " .....	39
60-70 " .....	16
70-80 " .....	6

Approximately 60 per cent of the cases occurred during the fourth and fifth decade, and

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over 80 per cent occurred after the age of 40. There were 56 males and 41 females.

#### PATHOLOGY

There were all the various degrees of progression of growth in relation to the kidney. In a few, 3 as far as could be determined, the growth was entirely limited to the kidney parenchyma. In 2 the growth had just broken into the pelvis or calyx by a minute opening. In some it had just broken through the renal capsule. Unfortunately, in a large number direct extension into the surrounding tissues or gross involvement of the peri-aortic glands was present. The growth involved the right kidney 47 times, and the left kidney 50 times.

The approximate percentages of the site of the growth in the kidney were:

	Percentage
Upper pole .....	25
Lower pole .....	18
Middle area .....	16
Total kidney .....	25
Kidney pelvis .....	16

There are many and divergent views on the classification of renal parenchymal tumours, and no two authorities are agreed. Some suggest calling them all nephromas; others suggest the following: (1) cysts, (2) tumours resembling adrenal tissue, (3) tumours not resembling adrenal tissue. The following abbreviated classification is used on our service. We are well aware of its limitations from the standpoint of the pathologist, but find it useful from the clinical standpoint.

- A. *Parenchymal.*
  - 1. Connective and vascular tissue.
    - (a) Benign—fibroma, angioma, etc.
    - (b) Malignant—sarcoma.
  - 2. *Epithelial.*
    - (a) Benign—adenoma.
    - (b) Malignant—adenocarcinoma, carcinoma.
  - 3. *Embryonal.*
    - (a) Benign, i.e., dermoid.
    - (b) Malignant, i.e., Wilms.
- B. *Pelvis.*
  - (a) Benign—papilloma.
  - (b) Malignant—papillary carcinoma, carcinoma.

Clinical differentiation of the various types of parenchymal growth in our experience is impossible, and confusion exists in the pathological classification of these neoplasms. The most common forms of kidney epithelial parenchymal malignant growths are adenocarcinoma and carcinoma, and the confusion of

these with the more rare types of growth such as papillary cystadenoma, etc., is not of clinical importance, for they are all malignant.

The pathological reports on the 62 cases operated on were as follows:

Adenocarcinoma .....	40
Carcinoma .....	15
Sarcoma .....	3
Embryoma (Wilms) .....	2
Papillary carcinoma (pelvis) .....	2

Embryonal tumours occur more frequently in children. Recently, however, a large renal tumour was removed from a 68-year old female patient. Sections of this tumour showed in some areas sarcoma and in others carcinoma. Evidently this was a growth somewhat similar in characteristics to the Wilms tumour. The sarcomas are much rarer, and are generally of the embryonic or mixed type. The sarcomas in our series of cases occurred (1) in a child aged 8 years, who was operated upon and died on the operating table; (2) in a child aged 4 years, who died 3 months after operation; and (3) in a male of 68 years.

There was an interesting case, a neuroblastoma of the adrenal, which had by direct extension involved the kidney pelvis. The pre-operative diagnosis in this case was primary growth of the kidney.

The growths of the renal pelvis are very similar in character to those of the bladder.

The metastases were either lymphatic to the retroperitoneal lymph glands, or, haemogenous to various parenchymatous organs. The metastases or direct extension of these tumours occurred in practically every organ of the body. They were present in the following locations: perirenal fat; adjacent lymph glands; renal vein; peritoneum; opposite kidney; adrenal glands; tongue; liver; lung; brain; pancreas; spleen; lumbar vertebrae; humerus and ribs.

Calculi are occasionally associated with tumours, and sometimes are completely surrounded by the growth. In one of our cases the patient was diagnosed renal calculus before operation, and it was the pain due to the calculus which brought him under supervision. At operation for removal of the calculus, an early adenocarcinoma was found in the kidney. Tumours of the renal pelvis are more often associated with calculi than is a tumour of the kidney itself.

### SYMPTOMS

The symptoms varied from no urological symptoms at all to combined gross haematuria, pain, and tumour. The chief signs and symptoms were:

	<i>Initial</i>	<i>Associated</i>
Hæmaturia .....	48	16
Pain .....	34	36
Tumour .....	9	29
Weakness and loss of weight ..	6	17
Anorexia .....	0	9
Varicocele .....	0	4

The symptom triad of hæmaturia, pain and tumour was present in 19 cases; most of these had metastases and were considered inoperable. This emphasizes the importance of early investigation of any urological symptoms such as hæmaturia, so that a correct diagnosis can be made before the classical symptoms are present, as it is then usually too late to hope for cure from any treatment. This makes profoundly important the investigation of any single symptom which points toward the kidney.

In this series hæmaturia was the most prominent initial sign, occurring in 50 per cent of the cases. Four patients had hæmaturia as the only sign. It is probably the most important single manifestation, as it immediately directs the patient's notice and the attention of the physician to the urinary tract. Twenty-five cases however did not have hæmaturia, either as an initial or associated sign.

Pain was the most prevalent symptom, occurring in 34 cases as the initial symptom, and in 36 cases as an associated symptom. Its character was generally that of a persistent, dull, gnawing ache, except during the passage of a blood clot, when it was colicky and radiating.

A tumour mass occurred as an initial sign in 9 cases, but as an associated one in 29 cases. The cases in which weakness and loss of weight were the initial features had far advanced lesions with multiple metastases when seen.

The onset of symptoms before seeking medical attention or being admitted to the hospital ranged all the way from 10 hours to 15 years. Over 60 per cent, however, sought medical attention within one year of the onset of symptoms. Two cases were admitted to our service after operation for tumours elsewhere in the body, one in the skull and one in the brain, in which the pathological report suggested a metastatic growth from the kidney, which was

later proved to be true. In these two cases there was nothing in the history or physical examination to suggest renal carcinoma. The patients presenting themselves soon after the onset of symptoms did not necessarily escape metastases, as was shown by the last two described cases. "Of the 97 cases of malignant growth of the kidney, 31 showed metastases or direct extension into the surrounding peri-renal structures, either before or at operation."

### DIAGNOSIS

In the majority of cases the diagnosis was not difficult. The history, the physical examination, cystoscopic and pyelographic study, retrograde and intravenous, usually revealed sufficient data to make an accurate diagnosis. The changes that may occur in the pyelogram vary from complete obliteration of the pelvis to very minute alterations in a minor calyx, and correct interpretations of these latter changes are sometimes very difficult. Conditions other than tumour may give somewhat similar pyelograms, such as hydronephrosis, extensive pyonephrosis, perinephritic abscess, retroperitoneal growths, congenital cystic kidney, blood clot in renal pelvis, and certain calculi. Intravenous urography, which at first it was thought would increase the percentage of early diagnosis in kidney tumours, has proved somewhat disappointing in our hands, and at present at least does not give nearly as much correct information as does a complete urological study. Aspiration biopsies have not been made in our series, but occasionally this procedure might be useful in differentiating a fixed hydronephrosis from a new growth. In any retroperitoneal mass in which the diagnosis is not absolutely clear an exploratory operation is indicated.

### TREATMENT

Nephrectomy with removal of the involved lymph glands, if any, is the only hope of cure. If at operation it is found that the growth has extended into surrounding tissues, is densely adherent, and hence incurable, a procedure to be considered is ligation of the ureter. This may be done when the kidney is not infected. It controls the pain due to passage of blood clots down the ureter.

In all our cases a nephrectomy was done through a curved loin incision, and all the involved regional lymph glands that could be

found were removed when possible. Transperitoneal nephrectomy was not necessary in any of the cases, nor was resection of the 12th rib. X-ray therapy may be used pre-operatively or post-operatively, or both. No definite routine was followed consistently. Pre-operative radiation is particularly indicated in cases of Wilms tumour. The tumour mass usually recedes, and it is at this time that a nephrectomy should be done. X-ray alone is only palliative, but is useful in the treatment of cases where there are metastases.

#### PROGNOSIS

The prognosis is far from encouraging, the ultimate mortality being given as high as 90 per cent by most observers. Israel in 34 cases reported 18 deaths from metastases within 2 years; Garceau in 43 cases, 39 deaths from

recurrence or metastases within 3 years; Cunningham in 31 patients reported that only 9 had passed the 3 year mark; Braasch had 27 per cent cures at the end of 3 years, and 10 per cent at the end of 5 years; Hyman reported 15 per cent cures at the end of 5 years. In our cases the vast majority have died from recurrence or metastases within 5 years; the occasional one lasting a few years longer.

#### SUMMARY

From this analysis of our series of renal tumours we are impressed with:

1. The importance of thorough and early investigation.
2. The extreme malignancy of kidney tumours and the poor prognosis.
3. Early nephrectomy is the only treatment offering any hope of cure.

### CONGENITAL ANOMALIES OF THE URINARY TRACT, THE UNDERLYING CAUSE IN MANY URINARY INFECTIONS IN CHILDREN\*

BY ALLAN B. HAWTHORNE

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**A**CUTE urinary infections in children, usually in the nature of an acute pyelonephritis, are relatively common. They appear frequently in the course of or follow an acute infection elsewhere in the body, are usually self-limited, and disappear, with or without specific treatment, in the course of three to four weeks. The chronic urinary infections, on the other hand, cover a multiplicity of lesions and persist often in spite of various forms of treatment, or recur after a certain period when the treatment has been discontinued.

The study of a series of 85 urinary infections seen on the wards of the Children's Memorial Hospital, Montreal, during the last several years has brought to our attention many interesting findings concerning both these types. In this series there were 61 infections in girls as compared with 24 in boys. Of the total number seen 45 were acute renal infections; the remaining 40 were chronic and persistent in type.

First, with the acute infections, there were 8 of these among boys and 6 of these under three years of age. There were as one would expect more infections among girls, with 21 seen

in the diaper age and 16 in the older children.

These 45 cases of infection, with two exceptions where death occurred, subsided in from three to four weeks following the onset, and, having been followed in the outpatient department, have shown no signs nor symptoms of a recurrence.

In 23 of these children an acute infection elsewhere in the body preceded or accompanied the urinary infection, 17 being of a respiratory nature and only 4 gastro-intestinal in origin, a much lower figure than one would ordinarily expect to find. The relation of foci of infection to urinary infection is very suggestive of a haematogenous spread, but a difficult thing to prove.

The symptoms complained of on admission in the younger children were mainly fever, accompanied by a mild gastro-intestinal upset; in the older group at times pain and urinary disturbances were also present.

Cultures of the urine showed a marked predominance of members of the colon family, with a smaller number of cases due to *Staph. pyogenes*. Two congenital anomalies were found in this group—stricture of the urethral meatus and of the ureteral orifice—both causing a mild and early hydronephrosis.

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The treatment prescribed for these children varied greatly, but forced fluids, rest, and proper elimination of the bowels were accompanied by the use of one or other and at times several in turn of the favourite urinary anti-septics—urotropin with ammonium chloride, ammonium or calcium mandelate, sulfanilamide or neoprontosil.

In the group of 40 chronic cases lasting six weeks or longer or those recurring after having been discharged from the wards or outpatient department with a sterile urine, we find that there were 24 girls and 16 boys. Among the girls of the diaper age there were six persistent infections, and none of these showed any congenital abnormality of the urinary tract to account for the chronicity of the infection. Four had a non-specific vaginitis with involvement of the urethra and trigone, and all cleared up with the use of sulfanilamide suppositories. The other two apparently had been insufficiently treated, and were discharged before several negative urine cultures had been obtained. Another error that we have found is, of obtaining a false report of sterility while the patient was still receiving relatively large amounts of sulfanilamide.

In the group of 16 girls with chronic infections over three years of age, 4 had various other foci of infection after the removal of which a cure of the renal infection was obtained. None of these girls showed any congenital anomaly. The remaining 12 were found to have some urinary anomaly. The main lesion was one of upper tract obstruction. The causes were uretero-vesical stricture, uretero-pelvic obstructions, renal hypoplasia, neuro-muscular dilatation of the ureter and pelvis, lack of rotation of the kidney pelvis, double ureters with dilatation of one or both branches of the ureter and pelvis. Three cases showed a hydronephrosis but without any evidence of obstruction. It is possible that these were the so-called inflammatory dilatations, the result of, rather than, the contributory cause of the persistent infection.

When we look at the chronic infections in the 16 boys we find 12 with congenital anomalies of the obstructing type. Those under three years of age showed strictures of the urethral meatus and of the uretero-vesical junction.

In the older boys we found 3 with an obstruction at the vesical neck, and each of them with the usual pathological picture seen so commonly in the older prostatic patient. One was due to

prostatic valves, the other two were typical contractions of the vesical neck. There were also two ureterovesical strictures and three of ureteropelvic obstruction, one of these caused by an aberrant vessel, the others by fascial bands and stricture. In addition there was one case of cord bladder with the usual accompanying atonic bladder and bilateral hydronephrosis. The remaining four cases were due to a sarcoma of the prostate with bilateral hydronephrosis and three of renal tuberculosis.

Grouping the chronic infections in both boys and girls, we find that in 60 per cent of the cases there was some congenital anomaly causing obstruction and urinary stasis.

The investigation of these cases of chronic urinary infection should begin with a general examination for evidence of focal infection, external examination of the urinary tract for gross evidence of disease, then a complete examination of the urine and urinary function. Culture of the urine should be a routine measure, as well as the estimation of the amount of residual urine.

In cases with a satisfactory renal function excretory urography should be carried out, either intravenously or subcutaneously.

The final measure should of course be the cystoscopic examination with retrograde pyelography and cystography, as that is the only and best method of gaining a satisfactory picture of the lesion involved.

In treatment the first principle is to relieve obstruction, and in our group of cases the obstructive sites were at the urethral meatus, the vesical neck, the uretero-vesical, and the uretero-pelvic junctions. These may be treated by incision, resection, dilatation, or by plastic operation. With the obstruction relieved, the appropriate urinary anti-septic may be pushed to the limit. There will of course be some cases where relief of obstruction is not possible, and while the newer anti-septics will render the urine temporarily sterile, relapse will usually occur, making nephrectomy or uretero-nephrectomy necessary.

#### SUMMARY

A series of urinary infections in children has been reported. There were 61 in females and 24 in males. Of these, 40 were chronic in nature, 24 in girls and 16 in boys.

Sixty per cent of these chronic infections per-

sisted because of urinary stasis or obstruction caused by some congenital abnormality in the urinary tract.

Among the remaining 40 per cent a certain number of the chronic infections in girls cleared up on treatment only after the removal of infectious foci elsewhere in the body.

#### CONCLUSIONS

1. All chronic urinary infections in children

should be thoroughly investigated, as the reason for their persistence can nearly always be found.

2. Congenital anomalies of the urinary tract causing stasis have been found in the majority of children suffering from a chronic urinary infection.

3. The diagnosis of congenital anomalies of the urinary tract causing stasis or infection should be made in childhood and not years later, in adult life.

### THE VALUE OF REMEDIAL EXERCISES IN TREATMENT\*

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PHYSICIANS have neglected the use of exercises as curative procedures, with the result that many quacks, cultists, trainers and others have used them as an entering wedge to obtain a medical practice.

Now, therapeutic exercises may be defined as supervised bodily movements, with or without apparatus, for the purpose of restoring normal function to a diseased or injured part. Both the amount and type of exercise must be properly prescribed in each case if good results are to be obtained. This is impossible if the doctor just tells his patient to go home and move his leg or arm as the case may be three times a day. Patients will either not move the part because it is painful or awkward, or else they will perform the movement in a desultory fashion, getting little or no benefit from it. Indeed in many cases they simply confirm themselves in some trick movement of an undesirable nature. To prevent this the patient should be taught the exercises and made to do them several times under the supervision of the doctor. It is probably best to have a trained physiotherapy technician teach the patient, as she will be able to spend sufficient time to see that the patient performs each exercise properly and encourage him with the more difficult procedures. Even after he has been taught it is wise to have the patient do the exercises under the technician's supervision three times a week to prevent him losing interest. When the patient is able to do the most complex exercises properly, and has

practically corrected his deformities then he may be trusted to carry on alone. Throughout the whole illness there should be periodic checks by the doctor to see that the proper exercises are being used.

The doctor must be ever ready to combat the attitude of the patient who expects the physiotherapy machine to cure him. Unfortunately, patients have more faith in the curative power of a machine than in their own efforts and they will remain passive, expecting to be cured by the short wave or other treatment. The machine is impressive and an adjunct in treatment, but in many cases active co-operation of the patient in the performance of exercises after such treatment is essential. Exercises are often thought of as being a series of physical jerks. Nothing could be farther from the truth. An exercise may mean simply the performance of a single movement correctly. It is in the teaching of these individual muscle movements that the physical therapist can be of value and assistance. Such movements may be performed either with gravity entirely eliminated by slings, or against both gravity and added resistance, depending on the case. Another commonly used exercise when actual limb movement is contraindicated is static contraction. The contraction of the muscle without joint movement is of great value in preventing atrophy. I shall now endeavour to point out a few common medical conditions in which exercises are of value and to describe a few of the most suitable exercises.

Backache is one of the commonest of all medical conditions. When this is due to postural deformities it can be very successfully treated by exercises. It is seen most commonly in ado-

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lescents, but both children and adults also develop the condition and yield very satisfactory results with treatment. In the child with a functional scoliosis the development of structural deformities can be prevented by exercises. In such a case the co-operation of the parents as well as of the patient should be obtained. First, the patient is taught the correct standing posture. All his postural defects in the resting position are corrected in front of a large mirror. Then, when he has learned to stand properly, simple spinal flexion exercises are started. At first he will tend to return to his original scoliotic posture. It is most important to prevent this and see that he returns to a proper position of rest. Once he is able to return to a proper position of rest then the complexity of the exercises may be increased. Too many technicians try to increase the complexity of the exercises before the patient has learned to return to a correct posture and so are disappointed with their results. Such exercises as raising the body from a lying to a sitting position both with and without the assistance of fixation of the feet should be used. Many modifications of such exercises by varying the position of the arms can be introduced.

The patient should also learn to hang from a bar. While hanging from the bar the masseuse should see that the correct position is maintained and if necessary over-correct any abnormality by manual pressure. The use of a Sayre's sling will be a great help in the treatment of younger patients, as full extension is readily obtained in this manner. A similar scheme of exercises may be used for the correction of kyphosis and lordosis when these are the postural defects. If the condition has become a structural deformity with bony changes a modified set of exercises carefully performed will prevent the increase of the deformity, relieve the pain, and frequently eliminate the need for operative interference. The middle-aged who are developing lordosis, paunches, and pain in the back will get dramatic relief from exercises. When treating these older patients the exercises must be graduated carefully to prevent overstraining. With care they can be increased until quite a difficult series has been mastered. These exercises are better than merely splinting the back with a corset, as the muscles, if properly developed, will act as a permanent splint and not as a temporary one

like a corset. If the patient is already wearing a corset an attempt should be made to get him to discard it gradually as his muscles get stronger.

In rheumatism or arthritis exercises have a very important place. In the acute forms of arthritis they are of no value and definitely contra-indicated, but in chronic and sub-acute cases they will prevent the advent of the incapacitating deformities and in many cases enable the patient to earn his living once again. These remarks apply with equal force to the chronic infectious arthritis, traumatic arthritis, and the specific infectious arthritis. By means of exercises the patient is enabled to live with his disease. During the more acute stages of the disease simple slow movements, assisted if necessary, of the affected joint through its full range once daily is adequate. This will be almost painless if it is done slowly and it will suffice to break down any adhesions that may form. As soon as the subacute stage has subsided and the patient begins to move his joints slightly himself then passive movements on a wider scale may be instituted. These should be increased gradually and assisted movements introduced. In such assisted movements the patient moves the joint as far as he can and the technician pushes it just a little farther each time. In this way the whole range of movement is increased. Full active exercises should be started just as soon as possible, to re-develop the weakened and atrophic muscles. All these exercises are best performed after the patient has had a preliminary treatment with either heat or heat and massage, as the tissues are then softer and a greater range of movement with less pain will be possible. All the active movements should be done with a long slow swing, and a slight over-swing each time will give the increase in range that is our aim. Jerky movements are useless as they lead to spasticity of the muscles. The movements should be done regularly, with an attempt at a systematic increase in amount and difficulty, or else no benefit will be obtained. Where possible the movements should be related to the patient's normal activities, and whenever possible he should be encouraged to help himself. Sitting and just wiggling his fingers and toes aimlessly will never get any results.

Fibrositis or fibromyositis is another common condition that requires exercises besides

massage and heat. After his heat and massage the patient should be encouraged to make a few simple movements. These movements should be increased at each visit. This gives the patient confidence and prevents atrophy and prolongation of the disease such as is seen in many cases where rest has been prescribed. If the exercises are painful even after heat the pain can usually be relieved by firm pressure with the hand over the painful area while the exercise is being performed.

Periarthritis of the shoulder deserves special mention. By this term I mean to include the cases of sub-deltoid bursitis and "frozen shoulder". These patients require properly supervised exercises to prevent wasting of the deltoid. The patient should be given specific movements to develop abduction, elevation, external and internal rotation of the shoulder. Pulleys should also be provided so as to encourage the patient in increasing his range. Climbing up a wall with his fingers is helpful, and turning a large wheel suspended vertically will increase the range of movements. The wheel helps by its momentum in carrying the arm over the painful spot.

Sciatica is a condition which shows beneficial results with exercises. After the acute stage has subsided gentle active movements are started. The patient begins by learning to relax. This is best done by having him raise the leg slightly and then allow it to fall on pillows. Pressing the knees together and then letting them fall apart also produces relaxation. After this the patient begins by using the glutei and hamstrings and then works on to the quadriceps and abdominal contractions, to mobilize the lumbar spine. Then the range of exercises is gradually increased to stretch the sciatic nerve, until finally the patient is able to touch his toes with the knees quite straight and flex his hip fully with a straight leg.

Another form of neuritis urgently requiring exercises is Bell's palsy. Exercises for this condition are best given with a mirror and with the patient screened off from all other patients or alone in a room. The following are a typical set of exercises. Closing the eye, smiling, whistling and blowing, closing the mouth tightly, showing the teeth, raising the upper lip, wrinkling the forehead both vertically and horizontally, dilating the nostrils, screwing up the whole face and the pronunciation of labials.

Resistance may be given to these movements as they become stronger. Such exercises should be persisted with up to three months after the onset.

Cases of hemiplegia benefit greatly from exercises. As soon as they have recovered from the preliminary shock attempts should be made to give passive movements. After a few weeks active movements will be possible. A definite program must then be mapped out for each patient and adhered to so as to give him the feeling that he is progressing. The following outline illustrates this point. (1) Active movements in single joints. These can best be obtained by means of slings. In these the patient is allowed to swing his limb to and fro while it is suspended. He should also be taught to hold a joint in a fixed position. Holding the joint in a fixed position teaches the patient to overcome the pull of spastic muscles. (2) Hold one joint in a fixed position while moving another one. For instance, the shoulder may be held extended while the elbow is flexed and extended. (3) Teach control of the whole limb. This is an extension of the two joint control to four and can be done in easy stages. As soon as the patient can control the movements of his limb then postural faults should be corrected. In teaching arm movements a long stick such as a broom handle is a great asset because it enables the patient to assist the paralyzed side with the good one. In the same way faster co-ordinated movements can be performed if ropes with pulleys are used. Individual finger movements should also be trained. Care is taken of course not to prescribe too strenuous exercises, and this is where the technician requires medical supervision for in her enthusiasm to get the patient back to normal she is likely to work him too hard. Failure to re-educate the movements in cases of hemiplegia will result in clumsy and unco-ordinated movements being developed which are of little use to the patient.

Disseminated sclerosis responds to exercises if carefully given. Rather than tell these patients that nothing can be done I believe that the doctor should work out with them a set of exercises and routine activities that come within their limited capacity. Active movements are emphasized for the flexor and extensor groups. These movements are developed to the point where the spastic antagonists are

stretched. Instruction in walking and balancing helps to partially overcome the ataxia. Similarly cases of tabes can improve their gait by training their remaining muscle sense and using their eyes to replace the loss. In treating tabetics one should adhere to certain principles. These are, first, to insist on precision in performing the movements; next, to give movements that do not require great muscle strength; and as the patient progresses increase only the complexity of the movements not the resistance. Give the movements quickly and over a long range at first. Finer movements will have to be taught last. Do the movements first with the patient's eyes open and later with them closed. Always make sure that adequate rests are given between exercises.

In infantile paralysis a great deal can be done from the start. The exercises should be commenced about six weeks after the onset of the disease when the fever, pain, and active processes have subsided. Graduated exercises are given, and care should be taken to see that weak muscles are never over stretched. The exercises are best done under water and with a small patient an ordinary bath tub may be used. If a suitable pool is not available the effects of gravity can be eliminated by means of slings. Improvement may be expected up to one year from the beginning of treatment and treatment should be continued for that time. After a year the patient should be observed from time to time to make sure that he continues to get full use of what muscles he has left. In giving these exercises it is best to start first with gravity eliminated, then include gravity, then add concentric and eccentric movements and finally movements against an increased resistance.

Cases of failing circulation in the legs can also be aided by exercises. Buerger's disease and arteriosclerotic cases respond very satisfactorily to exercises. The best type of exercises for these cases are those known as Buerger's exercises. These take many forms, but I have found the best one to be the following. Elevate the affected legs to from 60 to 90 degrees above the horizontal and allow them to rest on a support at this angle until blanching occurs. This will take from thirty seconds to three minutes. As soon as blanching occurs hang the feet vertically over the edge of a bed for from two to five minutes. To judge the

time required allow them to hang down for one minute more than is required to for the leg to redden. Then rest the leg in a horizontal position for about five minutes. This cycle should be repeated six times at each sitting. The group of exercises is performed two or three times a day. If the legs are painful when elevated the period of elevation may be reduced. As improvement occurs bicycle exercises, bending and extending the toes, and making a circle with the foot may be added while the feet are in the horizontal position.

Several pulmonary conditions require exercises in addition to other treatment to obtain complete cures. Of these asthma is perhaps the commonest. By means of breathing exercises a patient can achieve comfort in from one to two months even in longstanding chronic cases. The aims of the exercises in asthma are to teach expiration, diaphragmatic breathing, and correct posture. Now, an asthmatic usually maintains a position of inspiration and breathes with the upper part of his chest, and this is what we attempt to eliminate. When giving exercises the following points must be kept in mind if any results are to be obtained. At first if the patient is a far advanced case he should take a dose of adrenalin or ephedrine before starting his exercises. After the first time or two this can be discontinued. At any time before beginning the exercises he must blow his nose thoroughly. Carry out the exercises in the beginning with the patient reclining on a bed; later put the patient on a stool, and finally have the exercises done with the patient standing. Gradual steps like this will prevent the appearance of any distressing dyspnoea. Long breathing out is the first exercise taught. Never permit a long inspiration. Inspiration should always be accomplished by relaxing the abdomen. The patient should preferably make an S or F sound while expiring. This enables the instructor to see that expiration is being properly performed. When inspiring, the upper part of the chest is not used, and on expiration the abdomen should contract. All exercises should finish in expiration. Even if wheezing and coughing occur at first; persist with the exercises, as they will disappear after the second or third visit. Expiration should be timed and by gradual degrees extended until it takes about fifteen seconds. The exercises are to be done three

times daily and for at least ten minutes each time. They may be done any time the patient feels an attack coming on, and if properly performed should abort the attack. As soon as the patient has learned to do the simple exercises more complex ones may be instituted to hold his interest. The more complex exercises are no more effective than the simple ones and should only be given to the more intelligent patients. Most outdoor clinic patients will find the simple exercises difficult enough to do. Paying attention to these points, the following simple outline of exercises will be found effective with most asthmatics.

A. (1) Lie relaxed with the knees flexed. Expire slowly by sinking in the chest. (2) Inspire quickly by relaxing the abdomen, and then repeat 1.

B. (1) Sit feet apart, arms relaxed. (2) Breathe out slowly, dropping head, sinking chest and head; bend head over until the head is between the knees. (3) Rise up slowly, push out back, and breathe in. (4) Repeat 1.

C. (1) Standing, breathe out slowly sinking chest and abdomen in but keeping erect. (2) Breathe in a small breath and repeat.

A troublesome pulmonary condition com-

plicating pneumonia is delayed resolution. In such cases quite marked improvement can be produced by making the patient do breathing exercises accentuating inspiration. The inspiration may be developed on the affected side by having the patient do his breathing in while flexed to the normal side. In a very short time satisfactory expansion will be attained.

I have endeavoured in these few remarks to show how exercises can be used in the treatment of some medical conditions. In every case the exercises must be combined with other forms of treatment, both physical and chemical. Exercises are however a valuable adjunct which have been greatly neglected by the doctors.

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#### ATROPHIC RHINITIS OR OZÆNA IN CHILDREN\*

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THE classical textbook description of atrophic rhinitis is a picture of this disease as it occurs in the adult, *i.e.*, a picture of a local infection of long standing, rather the end-result of an active process than an infection in its early stages. This picture of atrophic rhinitis in the adult is too well known to necessitate giving more than the salient features. These may be summarized briefly as follows.

1. Wide nasal passages due to very small inferior turbinate bodies.
2. The nasal mucosa is pale and shrunken, especially over the inferior turbinals.
3. The walls of the nasal passages are more or less plastered with viscid pus and drying crusts.

4. There may or may not be the characteristic odour of putrefaction.

The patients complain of nasal obstruction and discharge, loss of sense of smell, headache, and general nasal discomfort. Their associates complain of the stench emanating from them. Hence the disease is not only a great physical discomfort to the sufferer but a great social handicap.

The appearance of the nasal mucosa in atrophic rhinitis in children is very different from that in the adult. In the young patient after the crusts have been removed from the nose and the pus of buttery consistency washed or wiped from the mucosa the mucosa appears deeply engorged. The turbinal bodies are small but the mucosa, while conforming to the shape of the bone, is tense rather than wrinkled. In brief, the condition seen in the child is an active inflammation of the mucosa of relatively

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short duration, while the picture in the adult case is the end-result of a long-standing infective process with sclerosis of the membrane.

The typical case of atrophic rhinitis is bilateral, but very important, especially when the etiology is considered, is the unilateral case where the septum is completely deflected. The typical case has a most indefinite onset, but some cases do occur after a too enthusiastic removal of turbinal tissue. The histological picture given in textbooks is that found in adult cases.

By way of review may it be stated briefly, according to StClair Thomson.<sup>1</sup>

1. "Atrophy of the nasal mucosa resulting in replacement of the ciliated columnar epithelium by stratified non-ciliated epithelium; obliteration of the capillaries and venous spaces; thickening of the walls of the small bloodvessels; round celled infiltration around the vessels and glands and conversion of the underlying tissue into dense connective tissue. The process is one of diffuse sclerosis which does not take place uniformly. It is not infrequent to find hypertrophy and even polypi in the region of the middle turbinal.

2. "Atrophy of the inferior turbinal bone.

3. "Profuse purulent secretion which dries into crusts which may or may not have the characteristic odour of putrefaction."

The whole mucous membrane is involved in this chronic inflammatory process, including in greater or lesser degree that of the adjacent nasal sinuses. Indeed suppuration of the sinuses long has been thought to be the cause of the condition. Many cases that have been considered true cases of atrophic rhinitis on careful examination have been proved to be chronic suppurative sinusitis. Only a small percentage of true atrophic rhinitis cases have chronic empyema of the sinuses.

At what age does this disease commence? From the fact that most cases are first seen early in the second decade it has been deduced that the disease commonly starts around puberty. However, many authors report cases in very young children. The writer has seen several cases under three years of age. The disease is more frequently seen in the female, but this may be only because this sex is more prone to seek advice for this unfortunate condition. As a rule most patients seek advice in the second and third decades, but many such patients seen at the Children's Hospital are in the first decade. The disease is rarely discovered in the aged.

Study of the literature on atrophic rhinitis convinces one that this once extremely common disease is much less common now. StClair Thomson, over twenty years ago, commented

on the comparative rarity even then of this once prevalent disease. He attributed this decrease in incidence to the more frequent removal of adenoids and tonsils and to the more frequent recognition of suppurative sinusitis cases which formerly had been diagnosed and treated as atrophic rhinitis. Some measure of the extreme rarity of the disease in children may be appreciated by a glance at the statistics of the Hospital for Sick Children, Toronto, for the last fifteen years. Only 30 cases of atrophic rhinitis were discovered in 60,390 new patients seen in the throat clinic of the out-patient department during that time. Children are seen up to and including those of 14 years of age.

Many theories attempt to explain the etiology of atrophic rhinitis. These theories are founded on one or both of its main characteristics, viz., (1) extreme width of the nasal passages; (2) profuse purulent discharge from the nasal mucosa. Most theories attempt to explain the structural abnormality. No agreement has been reached as to whether the abnormal width of the nasal passage is responsible for the infection, or the infected mucosa the cause of the abnormal width of the passages. Many attempts have been made to isolate a specific organism from the discharge, and several different treatments have been advocated on the assumption such an organism had been found. However, no specific organism has been discovered. The many theories to explain the great width of the passages may be summarized briefly as follows: (1) That it is a sequela of infected adenoids or sinusitis in early infancy. This is the oldest and most generally accepted theory; (2) abnormal development of the nasal chambers for one of the following reasons: resulting from some constitutional disease, i.e., syphilis, tuberculosis, etc.; vitamin deficiency; neurotrophic disease of the spheno-palatine ganglion with loss of vasomotor control; hormonal deficiency of one or more of the glands of internal secretion.

Recently Mortimer, from x-ray studies of the skulls of these cases, concluded that the great majority show evidence of some upset of the anterior pituitary secretion during or after the growth period. This theory is of course not applicable to the unilateral cases or those cases with too generous removal of turbinal tissue. As yet no theory adequately explains both the

abnormal width of the nose and the presence of the chronic infection of the nasal mucosa, because either is possible without the other and the one does not necessarily follow the other.

Review of the literature on the treatment of atrophic rhinitis is most revealing. With few exceptions all the treatments advocated have been highly successful. Mollison<sup>2</sup> comments on the optimism shown by the advocates of the many different treatments. However, the rationale of the various treatments seems to be grouped under four main ideas.

1. Palliative alkaline nose washes. Strict adherence to the regular and thorough cleansing of the nose keeps the condition under control, and it is known that if this is persisted in eventually the nose becomes healthy, possibly because of hypertrophy of the mucosa.

2. Measures to reduce the width of the passages: surgical, including, moving the walls (lateral) inward. Implantation of cartilage, bone, fat, ivory, blood, vaseline, etc., under the mucosa of the inferior turbinates or septum or floor of nose. Sympathectomy (carotid plexus).

3. Measures to produce hypertrophy of the mucosa of the turbinals such as, irritating drugs, packs and plugs, massage, radium and x-ray.

4. Measures to combat the infection (used locally), antiseptics, ionization, antitoxins, vitamins, toxoid, light therapy, vaccines, glucose, radium and x-ray.

Almost every conceivable form of treatment has been advocated as showing excellent results, except possibly sympathectomy of the carotid plexus; here failure is frankly admitted. As yet chemotherapy has not been tried. With these facts before us some skepticism of any new form of treatment must be forgiven.

Some three years ago Mortimer, Wright and Collip<sup>3</sup> published the results of their experiments on monkeys to corroborate the old nasogenital reflex theory and the so-called physiological congestion of the nasal mucosa, when oestrin was injected into these animals; also the use of this substance to produce the physiological response in the mucosa of patients suffering from atrophic rhinitis. These authors are to be commended for their elaborate and carefully conducted experiments and for their work, both experimental and clinical. Deeply interested in their clinical results, Dr. Wishart and the writer decided to test out their treatment at the Hospital for Sick Children, Toronto.

Considering the relative rarity of the disease, we were fortunate to secure eight patients in the age limit who attended our clinic, and who were not only typical cases but were extremely amenable and faithful in coming for the treatment. During the winter of 1938 these patients came twice a week for local treatment, which was done by the writer on Monday and by Dr. Wishart on Friday. At each visit the patient's nose was thoroughly cleansed and 0.25 c.c. of oestrin in oil was sprayed up each side. The patient was instructed to cleanse his nose daily at home with Seiler's solution.

The result of the test is shown in the following tables.

TABLE I.

Number of patients .....	8
Average age .....	11 years
Sex—Female .....	3
Male .....	5
Age of onset—Not known definitely, but of long duration in all cases.	
Earliest age of onset .....	3
Symptoms—Nasal obstruction, Nasal discharge and crusting, Foul odour from the nose.	
Number of cases of sinusitis .....	2
Duration of treatment—Three to four months.	
Immediate result of treatment—Excellent.	

The patients all had clean odourless noses when this intensive course of treatment was completed. Following this treatment the patients were instructed to clean out their noses once or twice daily with warm Seiler's solution used in a douche, a coarse syringe, or snuffed from the palm of the hand, this treatment to be tapered off if the local condition warranted.

In March, 1940, seven of these patients were re-examined by Dr. Wishart and the writer with the following findings:

TABLE II.

Patients re-examined .....	7
Patients still cleansing nose .....	7
Patients with clean noses .....	2

All patients admitted that their noses became very troublesome if not cleansed regularly.

N.B.—The one patient not seen was written to and here is the answer to the questionnaire sent him :

1. Ques.—Does patient think nose condition was benefited by treatment? Ans.—No, nose is decidedly worse.
2. Ques.—Is the nose discharging now? Ans.—Yes.
3. Ques.—Is there any crusting? Ans.—Yes, especially in the summer when breathing through nose is almost impossible at times.
4. Ques.—What treatment is being used now? Ans.—Soda and salt solution syringed through nose.

While no conclusions can be drawn from so few cases, the results cannot be ignored. The patients were all typical examples of atrophic rhinitis. They were carefully examined and treated for three to four months. They were very amenable to treatment and regular in attendance at the clinic. With one exception they all returned for re-examination two years later, and the exception gave a fairly accurate, if discouraging, picture of his present condition.

#### COMMENT

It is our impression that in this series of cases treated with oestrin no local improvement resulted from the hormone itself. Any local improvement must be attributed to the habit of cleansing the nose acquired during the time under intensive treatment.

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### COMBINED ARTIFICIAL FEVER, CHEMOTHERAPY AND VACCINO-THERAPY IN NEURO-SYPHILIS\*

BY ALBÉRIC MARIN

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IT is my purpose in this paper to review a two-years' experience in the treatment of different types of neuro-syphilis by combined artificial fever and chemotherapy, and the utilization of fever-producing vaccines as an adjunct. Although the time of observation is rather short it is possible to a certain extent to compare some results and to foresee the possibilities of vacino-chemo-physicotherapy.

At the pre-clinical period, when we deal with asymptomatic nervous lues, where a patient shows only a positive spinal fluid, results are generally better and quicker than in general paresis. Here also, one has to make a distinction between a case taken at the onset of his mental troubles and another who is at a more advanced stage. This explains that apparent contradiction of certain statistical reports. A department of syphilology where the majority of patients are usually seen in the few months following the appearance of their clinical manifestations (when general paresis is concerned) will naturally show better statistics than an asylum where they treat more deteriorated cases. That is why we have personally obtained a little more than 40 per cent of full remissions in the 144 cases of general paresis we have treated by malaria (1927 to 1936) in our Department of Dermatology and Syphilology in the Notre-Dame Hospital. Reports from psychopathic hospitals usually give about 30 per cent of full remissions.

The same remark can be made for the results we have had with artificial pyrexia. Although we treated all the patients as they came (excepting only those who presented physical contraindications) in the majority of these the deterioration of the central nervous system had not reached a far advanced degree.

On account of the numerous disadvantages and contraindications of malaria-therapy, various experiments have been conducted to find other methods which could improve the therapeutic results and lower the death rate, and also could be utilized on more aged or emaciated or anaemic persons. Finally, the method of chemo-physicotherapy has been established which is a combination of arsenic-bismuth treatment and artificial pyrexia given by physical agents (short waves or hot moist air).

Artificial pyrexia can be given to patients who could not be treated with malaria. I have treated by artificial pyrexia, patients with a certain degree of anaemia, some who were much emaciated, many over the age of 50 years (4 were 56 years old), and one pregnant woman in whom the pregnancy was not modified.\* Artificial fever given alone is not so efficient as when combined with chemotherapy (which cannot be done in malaria-therapy).

Generally the method of chemo-pyretotherapy

\* Read at the Seventy-first Annual Meeting of the Canadian Medical Association, Section of Dermatology, Toronto, June 20, 1940.

The delirious symptoms of this paretic patient justified our procedure. She had an incomplete remission, but was mentally greatly improved. With a 2½ months' pregnancy, she was submitted to ten weekly sessions of 5 hours (105°) combined with tryparsamide. She gave birth to an apparently normal child (9 pounds).

is used, but personally I thought it might be more beneficial to the patient if we added vaccines to arsenic and artificial pyrexia. This protein-therapy associated with hyperthermia would give a biological reaction which will add to its efficiency. I believed that there would be a certain advantage in uniting in one therapy modes of action which are not identical, that the combination, vaccines-drugs-heat, would intensify it; the bacterial protein would produce a shock, the high temperature would lower the resistance of the treponema and increase the permeability of the meninges; arsenic and bismuth would bring their specific action.

Therefore as a personal method I have set the following routine of treatment. On Monday, for instance, the patient receives at 7 a.m. an injection of tryparsamide and is immediately given a session of 5 hours of artificial fever at 105°. On Wednesday and Friday, he gets an injection of fever-producing vaccine (such as pyrifer) and of bismuth. These vaccines give an average temperature of 104°. This procedure is repeated for 10 weeks. Thus it will give total dosage of 50 hours of artificial fever at 105°, 10 injections of tryparsamide and 20 injections of vaccines and bismuth respectively. The patient is then treated at the Out-Door Clinic, with pentavalents or neo-arsphenamine and bismuth.

In the Department of Dermatology and Syphilology of Notre-Dame Hospital I have been using this method of chemo-vaccino-physico-pyretotherapy for 27 months with very good results.

Hyperthermal cabinets are used, to which a short-wave apparatus can be connected if desired. From October, 1937, to January, 1940, 220 patients suffering with various ailments (lues, chorea, multiple sclerosis, gonorrhœa, etc.) have received 1,318 treatments of about 5 hours each at a temperature of 105°. A total of 7,568 hours (at 105°) was given. One death occurred, which gives a death rate of about 0.4 per cent.

This total of 220 patients is given here only to indicate the death rate by this method. Of this number 137 patients were luetic. As a routine a lumbar puncture was made immediately before the artificial fever treatment and another immediately after. The average elapsed time between these two lumbar punctures is 3 months. After the fever therapy, if the patient has received adequate drug therapy at the Out-Door

Clinic, spinal fluid tests are made every six months.

I want to point out now that in the following tables the same patients appear only once, i.e., negative fluids are not counted twice. A total of 314 lumbar punctures was made.

Considering only those patients who had 50 hours of artificial heat combined with vaccines and chemotherapy (as outlined above), and where at least two lumbar punctures were made, 89 patients are left for this study.

These 89 patients were classified as:

General paresis .....	35
Tabes .....	12
Tabo-paresis .....	6
Meningo-vascular .....	2
Late asymptomatic nervous lues .....	34
 Total .....	 89
(19 women and 70 men)	
Average age .....	38 years

#### CLINICAL RESULTS

Far from being debilitating the combined heat-drugs-vaccines therapy produced improvement in the general condition of these patients. The majority of the working asymptomatic luetic persons could carry on with their usual work. Restlessness, insomnia, headaches were lessened or disappeared during the pyretotherapy or shortly afterwards. Many emaciated patients increased their weight. In tabes, diminution or disappearance of lightning pains and of vomiting were noted; improvement in muscular strength or in gait were also taken as signs of a good clinical response. In dementia paralytica the remissions (complete or incomplete) usually occurred between the 5th and 10th session of pyretotherapy. In three instances there was a "flare up" of the delirium by the end of the 50 hours. Two of these came to a complete remission in the two following months.

A patient is considered in full remission when able to resume his former occupation, even if he is still offering slight residual mental defects. In an incomplete remission the patient is not able to resume his former occupation but is able to do some other useful work.

In general paresis our percentage of full remissions is 54. It is higher than those of a psychopathic hospital for reasons stated above. It is also higher than those we personally obtained with malaritherapy, though we treated by both methods the same class of patients.

TABLE I.  
CLINICAL RESULTS

(a) General Paresis	
35 patients with various mental signs:	
	Percentage
19 had a full remission .....	54.3
9 had an incomplete remission .....	25.6
7 were failures .....	20.0
(b) Tabes	
12 patients with various signs:	
7 improved.	
5 not improved.	
(c) Tabo-paresis	
6 patients with signs of general paresis and tabes:	
4 improved.	
2 not improved.	
(d) Meningo-vascular	
2 recovered.	

#### SEROLOGICAL RESULTS

In Table II a comparison is made between spinal fluid tests made immediately before and after the combined heat-drugs-vaccine treatment.

TABLE II.

89 PATIENTS—50 HOURS WITH 2 LUMBAR PUNCTURES OR MORE

	Cerebrospinal Fluid		
	Before artificial pyrexia	After artificial pyrexia	
Strongly positive .....	66 - 74.2%	50 - 54.9%	
Moderately positive ..	14 - 15.7%	22 - 25.9%	
Weakly positive .....	6 - 6.7%	10 - 11.3%	
Doubtful .....	3 - 3.4%	7 - 7.9%	
Negative .....	0 - 0 %	0 - 0 %	
	89 100.0%	89 100.0%	

The average elapsed time between the two lumbar punctures being three months, it is interesting to notice that the immediate results show a favourable serological response. The strongly positive fluids are 20 per cent less. The weak and doubtful fluids show an increase of 9 per cent, the moderate of 10 per cent.

Our classification of spinal fluids into strongly positive, moderate, weak, doubtful, and negative is made along similar lines as those used by the workers of the Co-operative Clinical Group. The criteria are based on the degree of abnormality found in each of the following tests: quantitative Wassermann, gold solution, benzoin, Pandy, protein, cell count.

Of these 89 patients, 39 are eliminated for further serological study, because 18 have been under treatment for less than 6 months and 21 others (a) discontinued their drug treatment at the Out-Door Clinic, or (b) followed it very irregularly, or (c) refused to have a 3rd lumbar

puncture. Of the 50 patients left 20 have been under treatment at the Out-Door Clinic (after the artificial fever) for 6 months, 13 patients for 12 months, 17 for 18 months.

The chemotherapy to which the majority of these patients were submitted at the Out-Door Clinic consisted of tryparsamide (once a week) and bismuth (twice a week), except in 10 cases where neo-arsphenamine and bismuth were given on account of damage to the optic nerve.

Although 18 months of treatment is not considered a long period in cases of neuro-syphilis, and a 6 months' treatment is generally estimated as almost insignificant, in order not to "force" the statistics in favour of artificial fever, the three groups of patients treated for 6, 12 and 18 months are put together in Table III. It gives an average time of 12 months.

TABLE III.  
CEREBROSPINAL FLUID

	Before artificial pyrexia	Results in 3 groups taken together of patients treated 6 - 12 - 18 months
Strongly positive .....	34 - 68%	13 - 26%
Moderately positive ..	8 - 16%	11 - 22%
Weakly positive .....	5 - 10%	13 - 26%
Doubtful .....	3 - 6%	2 - 4%
Negative .....	0 - 0 %	11 - 22%
	—	—
	50	50

Before the combined heat therapy there were 68 per cent of strongly positive fluids as compared with 26 per cent after an average time of 12 months. There are now 22 per cent of negative fluids, whereas there were none before treatment was started. Moreover, the weakly positive and doubtful fluids, which were at the onset 16 per cent, are now 30 per cent. It is logical to expect that in the near future, many of these will increase the proportion of the negative group.

TABLE IV.  
THE CEREBROSPINAL FLUIDS OF THE 11 PATIENTS WHO  
BECAME NEGATIVE BEFORE TREATMENT:

Strongly positive .....	2
1 negative in 6 months	
1 negative in 12 months	
Moderately positive .....	2
1 negative in 6 months	
1 negative in 12 months	
Weakly positive .....	4
3 negative in 6 months	
1 negative in 18 months	
Doubtful .....	3
2 negative in 6 months	
1 negative in 12 months	
Negative .....	0

Of the 6 tests made on the spinal fluid the Pandy, protein and cell count are more rapidly influenced, the Wassermann and Lange reversing more slowly.

The 11 patients whose spinal fluid became negative did not all present the same degree of abnormality at the onset, neither did they respond evenly to the treatment.

TABLE V.  
(GENERAL PARESIS)  
4 PATIENTS HAD 2 COURSES OF ARTIFICIAL-FEVER  
(OF 50 HOURS EACH)

	<i>Before 1st</i>	<i>After 1st</i>	<i>Before 2nd</i>	<i>After 2nd</i>
Mr. Gra. XX:	Strong	Strong	(3 months after 1st) Strong	Strong Mentally the same
Mr. Mil. XX:	Strong	Strong	(5 months after 1st) Strong	Strong Mentally the same
Mr. Bla. XX:	Moderate	Strong	(8 months after 1st) Strong	(7 months after 2nd) Weak Mentally improved
Mr. Des. XX:	Strong	Strong	(5 months after 1st) Strong	Weak Mentally slightly improved

These 11 patients were classified as: 7 late asymptomatic nervous lues; 1 general paresis; 1 tabes; 2 meningo-vascular.

Of these 11 patients whose spinal fluid became negative, two had a negative blood Wassermann and Kahn reaction before treatment was begun. When the spinal fluid became negative 4 more had negative blood reactions.

Four patients were submitted to two courses of artificial fever. Between each course they received drug-treatment. They were deteriorated cases. Two patients showed mental and serological improvement after the second course.

#### SUMMARY

Artificial fever therapy has been given to 220 patients with one death (0.4 per cent).

Artificial pyrexia has been combined with vaccines and drugs in the treatment of nervous lues.

In general paresis this method gave 54 per cent of full remissions.

In tabes 7 patients out of 12 were improved.

The immediate serological results in 89 patients show a fair proportion of spinal fluids having a marked tendency to reverse. The strongly positive fluids have decreased by 20 per cent.

In 50 patients, who followed an adequate drug treatment during an average time of one year (after the artificial fever) there are 22 per cent of negative spinal fluids.

#### ECZEMATOUS DERMATITIS OF CONTACT TYPE\*

By S. E. GRIMES

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THIS type of eruption has been variously designated as eczema, contact eczema, contact dermatitis, allergic dermatitis and dermatitis venenata, but the above designation, which is self-explanatory, seems to be favoured by most dermatologists on this continent. The term dermatitis venenata is now usually restricted to those eruptions caused by hypersensitivity to plants. This is the most common type of eczema and is probably the most common of allergic diseases, and undoubtedly the most common of allergic skin diseases.

Undoubtedly there are many cases of contact dermatitis caused by primary irritant substances, and so are not allergic, but the great majority are caused by an acquired, allergic, epidermal hypersensitivity, induced by adequate exposure. The epidermis is the shock tissue and the reaction is manifested by epithelial response of eczematous character, and the lesions are primarily epidermal: papule, vesicle, spongiosis, etc. This is a non-atopic form of allergy as there is no familial history, no wheal reactions to skin tests, no known or regularly demonstrable antibodies, and no other form of allergy as an underlying cause. Of all conditions which affect man this dermatosis is the one which has

\* Read at the Seventy-first Annual Meeting of the Canadian Medical Association, Section of Dermatology, Toronto, June 20, 1940.

been most conclusively proved to be of allergic character. Many workers have been able deliberately to expose individuals to certain substances, to observe that these substances cause no reaction on first exposure, to note the time required for an incubation period to elapse and then to produce an eczematous dermatitis by re-exposure. Probably the earliest observations on epidermal hypersensitivity were those made by Jadassohn and Bloch. Jadassohn, in 1895, noted eczematous sensitization to mercury in patients receiving injections of a mercurial preparation. He observed the development of a dermatitis in the pubic area due to "gray ointment" previously applied, in a patient who received an injection of a mercurial preparation. These observations were made many years before the development of similar studies in hay-fever, or in asthma, or in any other form of allergy. Bloch carried out experimental sensitization of his own skin to primula, through application of concentrated extracts (primin). He became so hypersensitive that all primula plants had to be removed from his environment. Many more recent investigators have demonstrated experimental sensitization to various substances; Wise and Sulzberger to butesin picrate ointment; Spain and Cooke to poison-ivy extract; Grodnick to krameria, and many others too numerous to mention. Grodnick tested 100 persons with krameria by means of 24, 48 or 72 hour patch tests. A few reactors were noted within the first week and he concludes these represent a pre-existing sensitivity. The incubation period, in those sensitized with one application, ranged from 10 to 21 days. Most of those negative on the first application, were subsequently sensitized by 1 to 8 applications, and the onset of sensitization was followed by an activation, or lighting up, of the sites of previous applications.

As a result of the observations of many investigators, three distinct phases in eczematous sensitization have been noted: (1) *A period of refractoriness*, varying from days to years, in which the skin does not become sensitized with a substance, which may at some later time unaccountably cause sensitization. (2) *A period of incubation*, lasting approximately from one to three weeks, in which sensitization develops in a patient coming in contact with a sensitizing agent during a state of susceptibility to sensitization. (3) *A fixed reaction time*, varying usually from 16 to 48 hours, which is the time

elapsing between contact with an excitant and the appearance of clinical reaction in an already sensitized patient.

#### MECHANISM OF SENSITIZATION

The causal agents of contact dermatitis are allergens, and these substances produce disease because they are able to sensitize. These allergens are usually of small molecular weight and are not proteins or substances necessarily associated with proteins. Even elements such as mercury, nickel, arsenic, etc., are among the specific sensitizing agents. The allergens are usually oil, fat or water soluble, or substances which are keratolytics or detergents which remove the outer protective horn layers of the skin's surface.

Landsteiner and others have shown that many allergens, and perhaps even some of the agents of contact dermatitis, act as sensitizing agents because they combine with other and larger molecules. If certain chemical groups are combined with different proteins they confer on the latter their own specificity, and are thus partial antigens or haptens. Hopkins has suggested that all the excitants of contact dermatitis are haptens, and must pass through the horn and oil of the outer epidermis, and probably combine with a body protein before they produce contact dermatitis. However, Landsteiner and Jadassohn and Fierz have found also that certain simple chemical substances produce anaphylactic sensitivity without conjugation with larger molecules. In some instances it may require the larger complex to produce sensitivity, while the small molecule is by itself able to elicit specific reactions.

It seems likely that there are many factors, both local and general varying from individual to individual, which influence the process of sensitization. Our knowledge of these factors is meagre in the extreme. The physical and chemical properties of the skin are important. The presence of a thick keratin layer is a protective factor. Persons with a thick protective covering of oil, are less likely to become sensitized by water-soluble substances than are individuals with dry skins.

The experiments of Burkhardt indicate that the ability of the skin to neutralize alkali is of importance. He has demonstrated that the normal skin is capable of neutralizing alkali, and that this power seems to be retarded in the alkali-sensitive individual. He has found the

incidence of alkali hypersensitiveness to be 8 to 20 per cent in normal persons, whereas in alkali-eczematous individuals it is 90 per cent.

The sensitizing index of substance varies a great deal. Baer, Rostenberg, and Sulzberger showed that one drop of a 10 per cent acetone solution of 1 - 2 - 4 dinitrochlorobenzene, dropped on the skin, sensitized over 50 per cent of all persons. It has been noted that some substances can produce practically 100 per cent sensitization. Peck states that chemical structure plays an important rôle in the ability to sensitize, and that the presence of a double band in an organic compound will sometimes determine whether we are dealing with a strong or a weak sensitizing chemical.

Sulzberger and Rostenberg have presented a compilation and discussion of cutaneous reactions to about 500 different substances, elicited by over 10,000 tests in approximately 1,000 persons. They show that it is possible to establish the relative probability with which a given substance will produce eczematous sensitivity; and have named this the "sensitizing index" of the given substance. This figure is of importance in selecting substances for use in industry, as well as in the selection of substances for products such as clothing dyes, food dyes, ingredients of cosmetics, etc. Moreover, the authors show that it may be possible by a somewhat analogous method to select individuals who are less prone than others to eczematous sensitization. This they have called the establishing of a "sensitization index" of a given individual. This could be of practical value in selecting individuals who are suitable in occupations presenting certain eczema hazards.

Polyvalent sensitivities are common, and Brunsting and Anderson, employing the plant oils, have been able to show that there is frequently a group sensitization.

#### SPREAD OF SENSITIVITY

Once sensitization has been established in a given area of the epidermis it is usual for it to spread to involve the whole integument, but we must remember, particularly in applying patch tests, that localized sensitivities do occur, and also that some areas manifest a greater degree of sensitivity than others.

The mechanism of the spread of sensitivity has caused much speculation and experimental work. Various theories have been offered: (1) the allergen is brought from its sphere of influence into the whole body by blood and lymph and makes all the cells actively sensitive; (2) antibodies formed may be brought to all the cells of the body by blood and lymph, and (3) active sensitization spreads in the skin from one epithelial cell to the other by the intercellular bridges in the stratum spinosum.

Strauss and Coca have studied the spread of eczematous hypersensitivity to poison-ivy extract in the rhesus monkey. They found that if a full thickness cuff of skin on the monkey's arm was turned down, and sensitization induced below it, the cuff proved a barrier to any further spread. Conversely, animals sensitized on the arm unoperated on showed a generalized spread of hypersensitivity to all skin areas, except those below the cuff on the arm operated on. They conclude that hypersensitivity spreads through the skin itself, and through the epithelial cells themselves and not the cutis.

Landsteiner and Chase have studied this problem further with poison-ivy extract in the guinea pig, and have demonstrated that the hypersensitivity failed to become general only if the incision was deep enough to sever the lymphatics beneath the skin. The authors conclude that free lymph circulation beneath the skin is necessary for the spread of the sensitization.

The following conclusions have been drawn from the various experimental work by the 1939 Year Book editors. (1) The sensitization often spreads from the site of the sensitizing exposure by a centrifugal dissemination starting from the point of exposure. (2) The route of spread is not via the general blood circulation. (3) The spread takes place via the superficial structures of the skin beneath the epidermis, in all probability the lymph spaces or other structures of the cutis. None of the experiments permits the conclusion as to exactly what it is which spreads, nor exactly through which of the aforementioned superficial cutaneous structures the spreading takes place.

#### DIAGNOSIS

The diagnosis of contact dermatitis depends on the localization and clinical appearance, history, course and finally on the use of the patch test.

The localization and clinical appearance will usually suggest the diagnosis of contact dermatitis. In general, the face and scalp are first affected from hair dyes, cosmetics, etc.; the neck

and face are first affected from furs, fur dyes, scarves, etc.; hands and forearms are first affected from occupational substances, gloves, soaps, cleansers, etc.; the torso is first affected from clothing, girdles, etc.; feet and legs are first affected from shoe leather, polishes, socks, etc., and so on for a list infinitely long.

The history will usually need to be careful and exhaustive, enquiring into the occupation, which may direct attention to certain substances, the patient's hobbies, substances used in the household, etc. We must not lose sight of the fact that dermatitis of contact-type may also be caused by the ingestion and haemato-genous distribution of the causative agent. The best examples of this are the eczematous eruptions due to quinine, urotropin, arsenicals, chloral hydrate and mercury.

The patch test properly applied and evaluated is one of the most useful tests in dermatology. It was introduced by Jadassohn in 1894, and developed by Bloch. The tested substance is left on for 24 to 48 hours and the reaction noted at that time. This test, like all other tests, has certain drawbacks and limitations. We may get false negative and false positive reactions, and the results must be correlated with other data in the case. In view of the fact that localized sensitivities occur, the nearer the test is applied to the site of the original eruption, the more likely we are to get a positive reaction. Moreover, there is often a phase of desensitization following an acute attack of dermatitis, and there are also times at which the skin is refractory. Too early application of a test with causal agent will often cause a severe flare-up in the involved sites. The use of too strong a concentration of the test substance may induce sensitization or a flare-up. Volatile solutions and essential oils should be

dropped on the skin, as an occlusive dressing may cause a severe reaction. The proper test concentration for many substances has been worked out and Sulzberger and Rostenberg have published a list of over 740 different substances for testing. Schwartz has also listed the proper concentrations of many substances used for testing in industry.

#### TREATMENT

The treatment is, like the diagnosis, dermatological in the first place. The only successful treatment is the discovery and removal of the causal agent. In some instances this is very easy, in others extremely difficult, and in some cases impossible, especially with occupational contacts.

The value of specific desensitization, or hypo-sensitization has caused considerable difference of opinion. Many workers have claimed results in cases due to plant oils, but even here, there is great disagreement on the efficacy of this procedure. Schwartz states that workers who have become sensitized to a substance, may become desensitized, if supplied with protective clothing and ointments and allowed to continue at their work. After a long lay-off, however, they will lose their immunity. He believes desensitization should be attempted with minute increasing doses of the sensitizing agent, perhaps combining it with a protein such as egg albumen, fungous extracts, or the serum of the patient.

The field of preventative treatment offers great possibilities of success. The selection of substances with a low sensitizing index, for use in industry, and in products such as clothing, dyes, cosmetics, etc.; and the employment of persons with a low sensitization index in industries presenting eczema hazards, are methods which might be utilized with considerable benefit.

"Each case of syphilis represents a localized epidemic." This is because there may be for each patient that comes to the doctor or clinic for treatment many other cases of infection in members of the patient's family or among his intimate associates. At the Vanderbilt University Syphilis Clinic, 100 additional cases of early syphilis were found when contacts and members of the families of 122 patients with early infectious

syphilis were examined. Many of the additional 100 patients were not aware they had the disease. "Syphilis is a controllable plague and can be eradicated." Fundamental requirements for its control as an infectious disease, consist of early and accurate diagnosis, adequate treatment, epidemiological measures, and education.—Dr. E. Gurney Clark, of Vanderbilt University, *The Diplomat*, 1939, 11: 47.

## REGIONAL ILEITIS\*

By WILFRID L. GRAHAM

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WITH the increasing recognition of this disease it is of interest to record our experience in the Vancouver General Hospital. This has been chiefly with the acute phase of the disease. An excellent summary of the literature is given by Ravdin and Johnston.<sup>9</sup> At this date 413 cases were reported in the literature. We are adding 35 cases from our hospital which have been treated in 1937, 1938, and 1939.

This lesion cannot be described as a new disease but the term refers to a well recognized gross pathological lesion involving limited portions of small bowel, usually the terminal ileum. Isolated reports of cases have been recognized as early as 1828. In 1882 the gross and microscopical picture was described by Moore,<sup>7</sup> who even then denied the presence of any malignant or specific cause. In 1909 Braun<sup>2</sup> published the most comprehensive article previous to 1932 when the original paper of Crohn, Ginzburg and Oppenheimer<sup>3</sup> was published.

In the intervening period numerous articles were published describing a like condition, particularly noteworthy being Moschowitz and Wilensky's<sup>8</sup> article on "Non-specific granuloma of small bowel" in 1922, which emphasized the non-specific nature of the disease and the presence of foreign body giant cells. However, it was several years after Crohn's article before the disease was widely recognized. Hurst,<sup>5</sup> reporting 2 cases in 1937, states that previously only 3 cases had been described in England.

Our hospital records show the following incidence:

TABLE I.

1935 .....	1 case	1938 .....	10 cases
1936 .....	0 "	1939 .....	19 "
1937 .....	5 cases		

The sex incidence of the disease has been reported by Crohn as 2 males to 1 female. Ravdin<sup>9</sup> reported 57 per cent males to 43 per cent females. In our group we support Crohn's findings, i.e., males 65.6 per cent, females 34.4 per cent.

\* Read at the Seventy-first Annual Meeting of the Canadian Medical Association, Section of Surgery, Toronto, June 20, 1940.

The area of involvement in the 413 reported cases shows that the terminal ileum alone or terminal ileum and adjacent bowel was involved in 93.4 per cent of the cases and the terminal ileum alone in 63.2 per cent. In our series the terminal ileum alone was involved in all cases except one, and in this instance it was mid-jejunum and the area involved was approximately 5 inches.

The average age-group of the patients was 27 years, with a distribution as follows:

TABLE II.

Years	No. of cases	Percentage
1-10 .....	7	24.5
10-20 .....	9	31.5
20-30 .....	6	21.0
30-40 .....	4	14.0
40-50 .....	4	14.0
50-60 .....	3	10.5
60- .....	2	7.0

The oldest being 64.

We have been fortunate in not seeing during these years any case which has resulted in fistula formation. One case of recurrent terminal ileitis after a previous resection which was done 15 years before for a sinus following appendectomy was, in all probability, an unrecognized terminal ileitis at that time, although it was reported as a hypertrophic tuberculosis of the ileum. This case will be discussed in detail later.

In our series of 35 cases 28 have been subjected to an exploratory operation. The pre-operative diagnosis is as follows:

TABLE III.

Total cases .....	35
Operative cases .....	28
Pre-operative diagnosis	
Appendicitis .....	20
Intestinal obstruction .....	3
Pelvic infection .....	3
Intussusception .....	1
Terminal ileitis .....	1
Non-operative cases .....	7
X-ray diagnosis .....	6
Autopsy .....	1

We have divided our cases into the following groups for the sake of comparison.

TABLE IV.

1. Terminal ileitis with chronic appendix .....	24
2. Terminal ileitis with acute appendix .....	2
3. Terminal ileitis with complete obstruction .....	2
4. Terminal ileitis of tuberculous origin .....	1
5. Terminal ileitis substantiated by x-ray diagnosis	6

In the first group 24 cases were operated upon with a removal of the appendix with no deaths and no serious complications. In group 2 there was one death. In group 3 there were 2 cases in which a resection was done with recovery. One of these was the patient with a recurrence after 15 years. Group 4 consists of one case of hypertrophic tuberculosis of the ileum, with no involvement of the cæcum, discovered at autopsy. According to Dowdie only 8 cases have been reported in the literature until 1931. In the 5th group are the 6 cases diagnosed clinically and with x-ray confirmation.

The x-ray findings usually are based on one or more of the following findings: first, a narrow rigid lumen; second, dilatation and delay above an area of constriction; third, the so-called "string sign"; and fourth, retention at the ileocæcal valve after evacuation and air insufflation following a barium enema.

Concerning the etiology of this disease, it is interesting to note, though probably of no consequence, that 7 of the 35 cases were in Orientals. Our ratio of Oriental population on the Pacific coast is 1-16, or 6 per cent. The cause of the disease is obscure. We have noted that in all our cases involving the terminal ileum only that portion of the bowel involved is that which receives the blood supply from the ileal branch of the ileocolic vessels. From the gross and microscopic picture this would lead one to think that perhaps it might originally be a lymphatic obstruction from some cause that originated the disease or to some vascular obstruction, either from rotation of the terminal ileum as suggested by Batson or by an embolus as suggested by DeCourcy.<sup>4</sup> Bell<sup>1</sup> suggests the possibility of a mucosal infection spreading through the walls of the small bowel producing œdema of the mesentery due to lack of sufficient lymphatic drainage. In the 35 cases only 10 showed marked glandular involvement of the mesentery.

The various bacterial causes have not been proved. The discovery of the tubercle bacillus has not been substantiated, nor has guinea pig

inoculation been successful. Indeed the very high percentage of rapid recoveries would lead one to feel that it is not of a tuberculous nature.

The appendix has been suggested as a cause; a subacute appendicitis causing a lymphadenopathy with lymphatic obstruction, the subsequent recovery of the appendicular lesion and the associated œdema of the terminal ileum remaining. Ravdin<sup>9</sup> states that many of these cases have had a previous appendectomy and also that in many the appendectomy not only fails to relieve the condition but frequently leads to the formation of a fistula. This, however, is not our experience, for none of these cases had a previous appendectomy, apart from the case of recurrence, and, it is true, this was followed by a fistula of undetermined origin. However, the patient was well for 15 years before a definite diagnosis of terminal ileitis was substantiated.

Regional ileitis may be defined histologically as a productive inflammatory process exhibiting a granulomatous reaction in many instances and progressing through a relatively acute to a chronic, and, occasionally, stenosing stage. The lesion is characterized by fairly extensive but superficial ulceration of the mucosa and diffuse lymphocytic, plasma cell and mononuclear cell infiltration throughout all coats of the bowel, with accompanying œdema and fibroplastic proliferation occurring chiefly in the submucosa and associated with hypertrophy of the muscularis mucosa. Scattered throughout the submucosa pseudo-tubercle formations bearing a striking resemblance to true tubercles are found. The giant cells may even have the typical peripheral distribution of the nuclei of tubercle giant cells. The point of distinction lies in the lack of caseation in these pseudo-tubercles.

Grossly, the involved portion of bowel is sharply demarcated from the uninvolved portion, boggy, leathery, congested, dilated and more or less rigid, the subserosal vessels engorged, the mesentery œdematosus, and the regional glands large and succulent. While it is the terminal 15 to 20 cm. of the ileum that is usually involved any localized portion of the bowel from jejunum to rectum may be the seat of this lesion.

The diagnosis of terminal ileitis is not easy. As noted, 68 per cent of our cases were diag-

nosed as acute appendicitis. The duration of illness in these cases varied from 8 hours to 1 year; 6 cases had a history of over 1 month; 10 a history of 1 to 4 weeks; and 9 had a history of 3 to 7 days, which alone should make one dubious of a diagnosis of acute appendicitis in the absence of a general peritoneal involvement. Pain was present in all cases and was very severe in 5. In 8 cases the pain and nausea were associated with diarrhoea, and in 3 there was blood in the stool; 4 had distension, and in 4 a mass was palpable. Nausea was a constant accompaniment, with vomiting in 50 per cent. The temperature range was from normal to 102°. The leucocyte count was elevated in practically all cases, the highest being 25,000 with an increase in the polymorphonuclear cells.

The treatment depends, first, on the accuracy of diagnosis, and, secondly, on the stage of the disease. Conservatism is recommended in the acute stage of the disease. But when so frequently the diagnosis is in doubt, an exploratory laparotomy with no operative interference on the bowel, or at most an appendectomy, is indicated, we feel that we can expect an immediate resolution of the disease with complete recovery and without complications. This is in disagreement with Marshall<sup>6</sup> who published in March of last year 48 cases from the Lahey Clinic which they have observed over the past six years. In this series 29 cases were subjected to operation with resection of the bowel in 22 cases. The average length of hospitalization in our operative cases was 15.3 days, apart from the cases of resection. Of the patients not operated upon the average stay in hospital was 9.3 days. When the peritoneal cavity is opened with a pre-operative diagnosis of acute appendicitis and regional ileitis is encountered our experience with 20 such cases in which there was no mortality shows that no operative procedure should be directed to the ileum. Resection is thus definitely contraindicated in the acute phase of the disease.

In the chronic stage of the disease, which depends on the severity and continuance of the symptoms rather than on a definite stated time, the operation of election is a wide resection of the involved bowel, sufficient in extent at least to remove all involvement of the mesentery, either with glands or with oedema. In complete obstruction an ileostomy may be a first stage

with subsequent resection, but in our one case it did not seem to be of value, as the distension of the bowel immediately above the obstruction was not markedly relieved. I would not advise any short-circuiting operation such as an ileo-transverse colostomy or ileo-sigmoidostomy. A Miller Abbott tube may in future solve the emergency when this disease produces acute obstruction, although I have not been greatly impressed with its efficacy.

Specific therapy such as sulfanilamide or sulfaipyridine was used in 15 cases, but so far as one can determine it was not a factor in recovery of these patients, nor did it diminish the length of hospitalization.

Of the 33 cases surviving 28 have replied to our questionnaire and 26 have been perfectly well; 2 complain of residual symptoms, but not so severe as to interfere with their activities.

I would wish to refer specifically to 3 cases.

1. A case of complete obstruction with abdominal symptoms for 1 year. This patient had a low ileostomy performed and later a resection.

2. The second case is the one of terminal ileitis accompanied by acute appendicitis. The child died from a general peritonitis. In this there was a typical picture of an acute infective lesion which no doubt was an extension from the acute appendix to the bowel wall.

3. Case 3 is the one we believe to be of tuberculous origin. The patient was admitted to the hospital with pneumonia after an illness, stated to be of one month. The pneumonia was of a streptococcal type. He had diarrhoea and blood in his stool. There was no distension. He was obviously *in extremis* and died within 48 hours. At autopsy we found the terminal ileum involved in what appeared to be a grossly typical ileitis. There was no involvement of the cæcum or other area of the intestine. This patient had a pulmonary tuberculosis.

#### CONCLUSION

1. We are reporting 35 cases of regional ileitis, one of which is proved to be tuberculous in origin.
2. No deaths occurred in the cases in which there was no involvement of the appendix.
3. In only one case was the lesion not confined to the terminal ileum.
4. The ratio of males to females was 2-1, with no age-group preponderance.
5. X-ray offers a positive diagnosis.

6. Conservative operation or non-operative treatment resulted in a very high percentage of cures.

7. Sulfanilamide and sulfapyridine did not seem to be of help.

8. Fistula-formation was not encountered.

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## EFFECT OF VERNIX CASEOSA ON BACTERIA\*

By HERBERT LUBINSKI AND BEN BENJAMIN

Montreal

**A**LTHOUGH very serious cases of pemphigus or impetigo neonatorum are rarely encountered nowadays vesicles or pustules are occasionally observed on the skin of newborn infants. These lesions are rarely present at birth and usually appear after a few days. They may be single or multiple and crops of them may develop before the condition clears. Usually they are more annoying than serious. An occasional pustule may, however, go on to abscess formation, with or without bacteriæmia. Fortunately this occurs infrequently.

Cultures from some of these skin lesions have revealed pyogenic micro-organisms while others have yielded no growth. In our own experience *Staph. aureus* was isolated from a considerable number of pustules, but from a few no bacteria could be grown.

Variations in bathing technique as well as the application of various types of oils, ointments, and powders by themselves and as vehicles for antiseptic drugs have been credited with reduction in the number of these lesions encountered in newborn infants.<sup>1, 2, 3, 4</sup> The evaluation of the efficiency of any one or combination of these procedures is extremely difficult. On the one hand, nurseries in which no particular precautions are used may go on for a long time without the appearance of a single case; a few cases may occur and clear without the development of any further ones, although no changes in technique are made. On the other hand, cases appear sporadically and may reach epidemic proportions in a hospital nursery in which any of the foregoing supposedly preventive measures are employed.

An appreciable decrease in the incidence of

these lesions has been reported<sup>5, 6</sup> when the nursery technique of newborn infants was reduced to simply wiping off the excess blood on the skin at birth and not touching the skin further during their stay in the hospital. When this method was tried in our nursery no lesions were observed for several months, but without any apparent change in procedure a number of infants developed pustules. Any beneficial effect of this simplified technique may be explained by the absence of possible irritation from washing and antiseptics.

We were unable to find any reference as to whether vernix, which acts as a lubricant during delivery, plays a rôle in the protection of the baby's skin against infection. We were interested to know if, in its natural condition, it had any effect on bacteria.

Samples of vernix were obtained by carefully scraping the skin of newborn infants with sterile wooden spatulas immediately after delivery. These were placed in sterile cotton-stoppered tubes and kept in the refrigerator until used.

The ordinary modes employed in testing material for bactericidal or bacteriostatic power could not be utilized because of the ointment-like consistency of vernix and its insolubility in water or in broth. It was, therefore, necessary to improvise more suitable methods.

Cultures of *Staph. aureus hæmolyticus* (from a subcutaneous abscess) and *B. coli* (from a normal stool) grown at 37° C. for 24 hours on agar slants or in broth were used in our investigations. These bacteria seemed particularly suited, in spite of their resistance to disinfectants, because of the possible contact of the newborn infant's skin with them during or soon after delivery. Moreover, this type of staphylococcus was frequently isolated from pustules on the skin of newborn infants. Many speci-

\* From the Pathological Laboratories and the Department of Paediatrics of the Jewish General Hospital, Montreal.

mens of vernix were contaminated and were therefore discarded. The following experiments were carried out.

1. *Broth cultures.*—Approximately 2 g. of vernix which had been tested for sterility were added to tubes containing 10 c.c. of sterile broth. These were respectively inoculated with 1 loopful of a 24-hour broth culture of (*a*) staphylococci and (*b*) *B. coli*. This was repeated with 5 different samples of vernix and no inhibitory effect of the vernix was observed. The test tubes containing vernix and the controls all showed similar luxuriant growth after 18 hours' incubation.

2. *Cultures on solid media.*—The possibility that growth-inhibiting, non-soluble substances of vernix did not come in contact with the micro-organisms in the broth had to be considered. Therefore, solid media which permitted more direct contact of bacteria with vernix were tried.

(*a*) Approximately 1 g. of vernix was spread with a Drigalsky spatula over the surface of an agar plate. By this method the surface of the agar was not completely covered by vernix and gaps remained. Half of the plate was streaked with a loopful of culture grown on agar. This was carefully done so that bacteria were implanted upon and contiguous with margins of vernix which enclosed gaps. The other half of the plate served as a control for sterility. Undoubtedly a certain number of bacteria in the gaps could not come in contact with the vernix. However, any influence would manifest itself at the edges of vernix, as occurs, for example, when gold is placed on agar which has been inoculated with bacteria and no growth takes place within a definite radius of the metal. Seven different samples of vernix showed no inhibitory effect on the growth of staphylococci and *B. coli* under these conditions. After 18 hours' incubation similar abundant growth was present at the margins of the vernix as well as over the areas which were free from it.

(*b*) To make possible a more intimate and prolonged contact between vernix and bacteria, approximately 2 g. of vernix and 1 loopful of a 24-hour culture (grown on agar) were rubbed together in a sterile mortar. After the mixture had remained at room temperature for 30 minutes, half of it was spread on an agar plate, as described above. The other half was similarly treated after it had stood for 24 hours. In both instances no inhibitory effect on bacterial growth

was demonstrated in 7 different samples of vernix.

(*c*) It seemed possible the negative results might be due to the fact that the amounts of bacteria used were too great for the quantities of vernix and possibly the weak bactericidal effect of the latter. Similar experiments were made, using 0.1 c.c. of a 1:10,000,000 dilution of a 24-hour incubated broth culture. This represented from 50 to 500 bacteria according to the colonies counted on agar plate controls. Four different samples showed no growth-inhibiting effect even on this small number of bacteria. Slight differences above and below the number of colonies grown as compared with controls were well within the limits of experimental variation.

3. *Guinea pig inoculation.*—In order to determine if vernix had any effect against the invasion of skin by bacteria, virulent *B. diphtheriae* was used because of the typical infection which it produces when applied to scarified skin in the guinea pig. The technique of this experiment was that previously employed by one of us.<sup>7</sup> Guinea pigs weighing approximately 250 g. were used. An area of 2 to 3 cm. in diameter on the dorsal surface of the buttocks was clipped and shaved. Usually the skin was sufficiently abraded, but if not, it was rubbed with sand-paper until numerous tiny excoriations could be seen. Animals treated with a layer of vernix alone applied upon scarified skin survived without any evidence of infection.

Guinea pig A.—The scarified skin was completely covered with a thick layer of vernix. On this, a suspension of diphtheria bacilli was applied with an applicator without rubbing and the guinea pig remained tied down for about 30 minutes until the suspension fluid appeared to have dried.

Guinea pig B.—Approximately 2 g. of vernix and a loopful of *B. diphtheriae* (cultured on blood agar) were rubbed together in a mortar. This mixture was applied on scarified skin (as above) with a wooden spatula.

Guinea pig C.—As a control, a loopful of 24-hour culture of *B. diphtheriae* (grown on blood agar) suspended in 1 c.c. of 0.9 per cent saline was rubbed on scarified skin (as above) with an applicator. The animals were placed in empty cages without straw, and no food was put in for six hours, in order to avoid removal of vernix. Guinea pig A died after 5 days; B after

3 days; C after 7 days. Necropsies showed macroscopic and histological evidence of adrenal haemorrhage, typical of diphtheria, in all the animals.

The difference in the periods of survival was probably due to the difference in number of invading bacilli and, consequently, in amount of toxin absorbed. Repeating this experiment produced similar results. Vernix did not prevent the invasion of diphtheria bacilli nor the resulting fatal termination in the guinea pigs.

#### SUMMARY

No inhibitory effect of vernix caseosa on the growth of staphylococci or *B. coli* was observed *in vitro*.

#### AN UNUSUAL INJURY TO THE CIBRIFORM PLATE\*

BY G. EDWARD TREMBLE AND F. J. DESMOND, JR.

*Montreal*

As a rule only cases showing good results are presented at medical meetings and in the literature. However, it would appear worth while to occasionally report cases which are instructive even though the results are not so favourable as was anticipated. In view of this, it was thought the following case was of sufficient interest to report.

A female patient, R.W., aged 24 years, attended the oto-rhino-laryngology clinic of the Royal Victoria Hospital, complaining of nasal obstruction, post-nasal discharge, and generalized headaches. Treatment in the clinic along the usual conservative lines alleviated the first two complaints, but the headaches continued and investigation in other clinics revealed no cause for the symptom.

For diagnostic purposes, (and as part of an investigation of the lymph drainage of the sphenoid sinuses being carried on at this hospital) it was decided to irrigate the sphenoid sinus.

On examination of the nose, the septum showed a marked deflection high up on the left side. The mucous membrane was of normal colour, and after shrinking the sinus openings appeared clear and free of infection. On December 11, 1939, after a preliminary anaesthetizing of the nasal mucous membrane with a 10 per cent solution of cocaine, a sphenoid cannula was introduced into the sinus. Because of the septum it was necessary to insert the instrument high up anteriorly in order to pass the obstruction. This was followed by the escape of about 5 c.c. of brownish fluid (probably cystic, although no examination was made at that time). Following this, 8 c.c. of thorotrust were inserted into the sinuses through the cannula and the patient sent for x-rays of the skull.

\* Presented before the Oto-laryngological Section of the Medico-Chirurgical Society of Montreal, in the Royal Victoria Hospital, on February 15, 1940.

No inhibitory effect of vernix caseosa on invasion through the skin and lethal intoxication by *B. diphtheriae* was obtained in guinea pigs.

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#### Case Reports

These showed a small, incomplete development of the sinuses. Washings from the sinuses at that time revealed a moderate growth of *B. alkaligenes*, although no gross pus was seen.

It was decided to irrigate the sphenoid sinuses again on January 10, 1940, because the patient felt much better after the previous procedure. On puncturing what was presumed to be the anterior wall of the left sphenoidal sinus, there was an immediate escape of bloodtinged fluid at a fairly rapid rate. It was at once realized that possibly the subarachnoid space had been entered, so the instrument was blocked at its free end, anchored in position, and an x-ray taken (Fig. 1). This

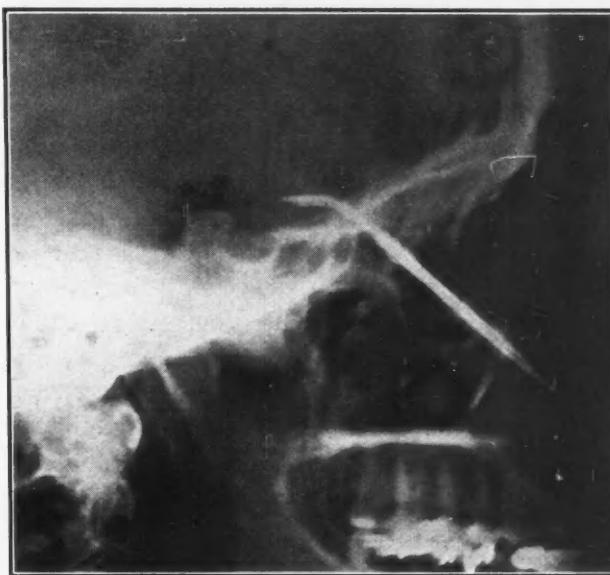


Fig. 1

showed that the cannula had perforated the cribriform plate about 0.5 cm. anterior to the anterior border of the left sphenoid. The cannula was at once removed, but the escape of cerebrospinal fluid continued. Since this accident the curve of the instrument has been changed slightly and a guard placed near the tip for added safety. The patient complained of very severe headache and was placed in a prone position, which relieved the pain somewhat. While being admitted to the hospital nausea and projectile vomiting developed.

On the advice of the neurosurgical consultants, the foot of the bed was elevated so as to constantly flush out any infection, the patient was warned not to blow the nose, and chemotherapy, with sulfapyridine, grains 5 q.2.h. x 10 daily was started. The cerebrospinal fluid leak stopped within six hours and at no time was there any elevation of temperature. Vomiting ceased shortly after admission to hospital, although a mild nausea persisted, this latter presumably due to sulfapyridine therapy. The patient was discharged from hospital on January 14, 1940, symptomless.

#### COMMENT

In considering the cause of this accident two factors should be considered. First, x-ray studies revealed that this patient had a cribriform plate that sloped downward and posteriorly, an anomaly said to occur once in every 1,000 skulls. Secondly, the septum should have been corrected in order to obtain a clear view of the landmarks, particularly the left middle turbinate.

The prognosis in these cases is not nearly as discouraging as one might expect, providing immediate treatment is begun at outlined above, and providing there is no acute cold present. It is estimated that easily four out of five cases will not develop symptoms so long as infection is not introduced and the patient is free from coryza. However, the neurologists point out that there is always the possibility of a meningitis which may occur as late as five days after the injury.

Noble and Brainard<sup>1, 2</sup> found in their research that the most common bacteria in the normal nose are *Staph. albus*, diphtheroids, Gram-negative cocci and micrococci, as well as some saprophytic anaerobic bacteria, especially the *Staph. parvulus*. The most common transient bacteria, as well as being the most common in disease, are pneumococci, *H. influenzae*, and haemolytic streptococci. The prevalence and sub-types of the organisms vary with the geographical situation of the surveys.<sup>3</sup> However, pneumococci are less frequent in adults than in children, and Webster and Hughes<sup>4</sup> report that the incidence of pneumococci in the nose closely parallels the occurrence of colds and coryza. It also seems to be a fact that normal healthy sinuses are sterile.<sup>5</sup> The high incidence of staphylococci in the nose is misleading, as it is most commonly found anteriorly in the nose, and is usually associated with crusting.<sup>6, 7</sup>

The usual pathogenic organisms found, i.e., streptococci, pneumococci, and *H. influenzae*, can, fortunately, be controlled by chemotherapy.

In this case, sulfapyridine was used in small doses, totalling 50 grains per day.<sup>8</sup> This dosage

may be increased to as much as 90 grains or more per day, provided that the usual dangers are recognized and precautions taken to prevent their occurrence, e.g., daily blood count, urinalysis, etc.

Basing an opinion on this case it would appear advantageous to prescribe small equal doses of the required drug in order to keep an even concentration in the blood.

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#### AN ACUTE ABDOMINAL PROBLEM

By J. L. LITTLE, M.D., F.A.C.S.

*International Hospital, Kobe, Japan*

Miss M.C., aged 25, a nursing sister, suddenly developed acute abdominal pain about 11 p.m. She had been in quite good health and on duty in the hospital all day. In the evening she attended a music recital and at a reception afterwards ate a "meat paste" sandwich. Her bowels had moved normally that morning, and she had enjoyed all her meals with no distress whatever.

When we were summoned at 1 a.m. we were informed that the patient had been in unusually severe pain. The slightest movement increased the pain, which had begun over the entire abdomen and finally settled in the right lower quadrant. Nausea without vomiting was constant. The menstrual cycles had been regular, and the next flow was expected within six days. Coincident with the onset of the pain was a sharp perianal ache and a sensation of urinary urgency.

Our examination revealed a young woman in a condition of mild shock. She was drawn-up in flexion; she was breathing rapidly and suffering considerably. The temperature registered 99.2° and the pulse 94.

The lungs and heart were clear. The entire abdominal wall was tender on pressure, but acute local tenderness was centred over the right iliac fossa. The skin was hyperesthetic over the whole right lower quadrant. Pressure over the sigmoid produced referred pain over the right side. There was perhaps a trifle less rigidity over McBurney's point than one usually associates with acute appendicitis. Digital examination of the rectum elicited exquisite pain in the right fornix, and at the same time nausea and pain were produced on attempts to tilt the cervix from side to side. The urine was free of albumin, sugar and blood. The leucocyte count was 12,800 with polymorphonuclear preponderance. Acute salpingitis was considered, but ruled out.

On a provisional diagnosis of acute appendicitis the patient was prepared for operation.

Nupercain spinal anaesthesia was employed. Due to the pelvic nature of the symptoms a Battle right-rectus approach was decided upon. When the celiac cavity was opened filmy patches of dark blood were observed over the viscera. There was two-thirds of a cupful of extravasated blood in the utero-sacral pouch. The tubes were congested. The left ovary was studded with large lutein cysts the size of a bean or large pea. The right ovary was enlarged and presented a ruptured lutein cyst

about the size of a small chestnut. From the cavity trickled a thin stream of dark blood. The ruptured cyst was curetted with gauze and the cavity obliterated with a purse-string suture. The appendix was removed although free of disease. Closure without drainage completed the operation.

A sharp febrile rise followed that evening and fell to sustained normalcy on the third day. Menstruation appeared thirty hours after the laparotomy and ran its usual course of four days. The rest of the convalescence was uneventful.

The final diagnosis was that of ruptured lutein cyst, or, as it has been termed, "apoplectic ovary". After the operation we referred to some seven quite recent textbooks seeking a description of a similar case. In only one of them, Bailey's *Emergency Surgery*, was there any clear description of the condition. The author records that he had met with the condition a number of times, but on each occasion had opened the abdomen on a hesitant diagnosis of mild acute appendicitis.

In conclusion, when one is confronted with a case of sudden, severe, lower abdominal pain in a young unmarried woman, the diagnosis of "apoplectic ovary" should be considered. If temporizing be rejected as a dangerous course, then the safe thing is to expose the adnexa as well as the appendix by means of a right rectus incision.

#### AN ERUPTION CLOSELY RESEMBLING LICHEN PLANUS DUE TO WHEAT GERM

By A. HAMILTON NEWMAN

*Montreal*

The patient, M.D., aged 47, male, developed in the spring of 1939 an intensely irritating condition of the

skin. Examination disclosed an eruption of both palms, wrists, and arms as far as the elbow, which was more marked in the flexures. On the right flank there was a patch about the size of the hand and another affecting the skin of the mid-lumbar region. On the wrists and arms the papules were for the most part discrete, but at the bend of the wrist and elbow they had a tendency to mass together and form scales. The individual papules strikingly resembled those of lichen planus, being angular, umbilicated and striated. The colour of the papules was not however quite that of lichen planus, which is purplish, but tended to a brighter, more reddish, hue. The evolution of the papules followed also a somewhat different course, appearing in tiny rounded elevations like minute shot beneath the skin and later taking on the shape and character of the papule of lichen planus. The first appearance of the eruption came on the right flank and lumbar region, later showing on the palms of hands and spreading to wrists and elbows.

At first lichen planus was the diagnosis, but in spite of treatment the condition continued to spread. Later on close questioning revealed that the patient had been taking a preparation of wheat germ and was still taking the same daily. Shortly after stopping this the eruption slowly disappeared and the itching abruptly ceased. Six weeks later it had almost disappeared. As a test wheat germ was again taken, with the result that the signs and symptoms returned; new papules appeared with intense itching.

Since the particular preparation of wheat germ the patient was taking contained the vitamins B<sub>1</sub>, B<sub>2</sub> and B<sub>3</sub> along with vitamin E there was the question of causation by the other factors. Accordingly fresh brewers' yeast was given with no result.

Finally when the lesions had progressed to recovery wheat germ oil was administered and there was an immediate flare-up and all the signs returned. A second test under same conditions had the same result.

### Clinical and Laboratory Notes

#### A METHOD OF CIRCUMCISION, USING THE ELECTRO-CAUTERY

By T. C. BRERETON, M.D.

*Winnipeg*

The first step is to retract the foreskin and free it right back of the corona as far as it will go.

The next step is to bring the foreskin back over the gland to its normal position.

Then draw the foreskin back until the junction of the skin and mucous membrane is the most anterior part of the foreskin. Now seize the upper part of the foreskin at this junction of skin and mucous membrane with a pair of artery forceps and clamp the forceps. Seize the lower part of the foreskin at the junction of the skin and mucous membrane with another pair of artery forceps and clamp on.

Next drag on both these forceps. This draws not only the skin but also the mucous surface forward at the same time. Now this drag causes

the corona of the glans penis to come into view through the mucous and skin tissue.

Then take artery forceps with a fairly long jaw, open the jaws and place one jaw on each side of the dragged out foreskin and carry the jaws back until they lie one-eighth of an inch in front of the corona of the glans penis and parallel to the corona.

Clamp this forceps and as the jaws close they force the glans back from under the artery forceps. Clamp the forceps.

Now remove the foreskin by electro-cautery at cherry-red heat by burning along the distal surface of this last forceps. This should be done rather carefully by burning only a little at a time, to prevent the forceps from becoming too hot.

As soon as the foreskin is removed unclamp the forceps and then retract the foreskin until it is back of the corona, where it should be made to stay until you are sure the wound is all healed, usually within two weeks.

No dressing is required.

## Editorials

### DANGERS FROM THE INDISCRIMINATE USE OF THE BARBITURATES

DERIVATIVES of barbituric acid (and their line seems endless) are becoming increasingly popular with the profession and, we regret to say, with the laity. So much so that their use might almost be called a vogue. This is not surprising, for these agents possess medicinal properties of great value and were regarded as harmless. With the passage of time, however, it has been demonstrated that, like all powerful drugs, they possess their own peculiar drawbacks and dangers. This means, of course, that they should be used with knowledge and discretion. The dangers we have specially in mind are poisoning, accidental or pre-meditated, and addiction. So far as we are aware, no cases of addiction or of suicide have been reported in Canada; a few cases of poisoning (not fatal) have been recorded in our *Journal*. But matters seem to be different in other countries. Dr. W. E. Hambourger,<sup>1</sup> speaking of the larger cities in the United States, says "Barbiturate addiction is fairly common, making up one-tenth of all drug addiction cases (excluding chronic alcoholism)", and adds "The evidence clearly indicates that the barbiturates are responsible for many suicides, successful and attempted, as well as for many so-called 'accidental' intoxications."

Some have suggested that intoxication from the barbiturates may be due to impurities in the products. Mr. H. M. Lancaster, Chief Dominion Analyst,<sup>2</sup> however, informs us that his Department has found that these products have been found to be in conformity with the standards set forth in Section 6 of the Food and Drugs Act of Canada, meeting the specifications set down in the various pharmacopœias and in other generally recognized standard works. Impurities cannot, then, be the cause.

The toxic manifestations of the barbiturates are usually found in those who have taken one or other of these drugs in ther-

apeutic doses over a prolonged period of time, or an over-dose within a few minutes or hours. Also there are idiosyncratic persons who react excessively to minute doses. The effects of such overdose may be trifling and evanescent, severe or even fatal. The various members of the barbiturates differ in their degree of toxicity. Scarlett and MacNab,<sup>3</sup> in an illuminating article, found in the literature up to 1934 record of no less than 408 deaths from barbiturate poisoning, and give a list of the incriminated drugs in the order of their toxicity. We quote their figures for those members which are in most common use: Veronal, 247; Luminal, 41; Evipan, 40; Allonal, 17; Pernocton, 13; Gardenal, 12; Somnifen, 7; Nembutal, 5; Amytal, 5; Dial, 4.

The following are the toxic features that have been met with: stupor, coma; nausea, vomiting, diarrhoea, and epigastric pain; hypotension; hyporeflexia; tachycardia and cardiac arrhythmia; urinary retention; involuntary urination and defaecation; pulmonary oedema; cyanosis; dilated pupils; contracted pupils; various skin rashes; anaemia; neutropenia.

In view of the foregoing considerations it would seem proper to ask that "counter-prescribing" and the sale of the barbituric acid derivatives except on a doctor's prescription be prohibited. So far as Canada is concerned, Mr. Lancaster, to whom our thanks are due for his courteous response to our enquiries, states that registration is not granted to proprietary or patent medicines which contain barbiturates, and that, under the Food and Drugs Act, steps have been taken to ordain that a label warning of the presence of a potent or dangerous drug be affixed to the container. More than this, however, would be desirable.

The untoward results of the therapeutic administration of the barbiturates can usually be prevented by attention to the following

1. HAMBOURGER, W. E.: The promiscuous use of the barbiturates, *J. Am. M. Ass.*, 1940, **114**: 2015.

2. LANCASTER, H. M.: Personal communication.

3. SCARLETT, E. P. AND MACNAB, D. S.: Poisoning from phenobarbital *et seq.*, *Canad. M. Ass. J.*, 1935, **33**: 635.

details. When any preparation of the barbiturate group is being exhibited, even in the accepted therapeutic dosage, for a length of time a careful watch for the first appearance of toxic signs and symptoms should be maintained. The possibility of idiosyncrasy should not be overlooked. The administration of the drug should be entrusted to some reliable attendant and *not* to the patient. Richards<sup>4</sup> has called attention to the following curious and pertinent fact, to explain which he has borrowed the term "automatism". He records two cases of Dial poisoning in which amnesia occurred. The patients were found with an empty box of tablets beside them yet they remembered that they had planned to take only two of these, and could remember taking only two. Evidently the drug produced forgetfulness of each preceding pill taken so that the patient retained the impression that he needed one more.

Finally, the contraindications must be remembered. Scarlett and MacNab (*loc. cit.*) call attention to the following points.

1. Senile patients require a smaller dose.
2. Debilitated patients tolerate the drug poorly.
3. Patients with arteriosclerosis, hypertension, and myocarditis react poorly to the shorter-acting barbiturates because of the marked effect on the blood pressure, and may complain of vertigo, and ataxia.
4. Severe genito-urinary disease may be an absolute contraindication.
5. Defective liver function makes anything but small doses inadvisable, and continuous administration is to be avoided.
6. Advanced pulmonary disease and, particularly, pulmonary congestion are contraindications to the use of the barbiturates before operation because of their action on the respiratory centre.
7. Severe toxæmia from sepsis increases the susceptibility to these drugs.

We may add that barbiturates should always be prescribed with great care for fear of causing addiction, particularly in treating mental cases.

The diagnosis of barbiturate poisoning can be made from the history and attendant circumstances and the detection of the drug

in the urine. A good test for the latter can be found in Delmonico's article.<sup>5</sup> Cases of coma should always bring to mind the following possibilities—concussion, cerebral haemorrhage, uræmia, diabetes, acute alcoholism, opium poisoning, barbiturate poisoning and epidemic encephalitis. The diagnostic points in most of these conditions are so well known that they need not be detailed. In contradistinction to what we find in opium poisoning the pupil in barbiturate poisoning is usually dilated, with natural or slightly delayed pupillary reaction. Exceptions to this statement have occasionally been met with, however. Nystagmus is often seen and is an important diagnostic point in distinguishing barbital poisoning from other forms of coma.

The fatal dose is in general fifteen to thirty times the therapeutic dose. Barbital may cause death from as little as 0.7 grams; the average amount is 10 grams. With Phenobarbital death occurs after 3 to 4 grams have been taken. In the case of Dial the fatal dose is about 2.4 grams.

The treatment for barbiturate poisoning should be conducted along the following lines.

In as much as drugs of this class are narcotics and depressants of the central nervous system stimulating remedies are in order. A special danger is from vascular paresis, which may lead to pulmonary congestion and oedema, pneumonia, and decubitus. The heart and circulation, therefore, should be stimulated.

A majority of those suffering from barbiturate poisoning are admitted to hospital in a state of coma. This fact conditions to a large extent the lines along which resuscitative measures should be conducted. Before other measures are instituted the stomach should be thoroughly emptied of its contents. The patient's head should be kept lower than his feet and postural drainage maintained as long as seems desirable. Any secretions that accumulate in the buccal cavity should be removed by suction. Feeding should be forced, the stomach being washed out previously. Enemas of strong coffee are often useful. Catheterization should be performed every four to ten hours.

4. RICHARDS, R.: Symptoms of poisoning by hypnotics of barbituric acid group, *Brit. M. J.*, 1934, 1: 331.

5. DELMONICO, E. J.: Tests for derivation of barbituric acid, *Proc. Staff Meet., Mayo Clinic*, 1939, 14: 109.

Diuresis may be assisted by the administration of xanthin diuretics, e.g., aminophylline in doses of 0.25 gram in 10 c.c. of water, which may be given in dextrose infusion every 8 hours.

An important part of the treatment is the administration of stimulant drugs. Orford<sup>6</sup> speaks highly of coramine for its effect on the respiratory centres. More recent authorities prefer picrotoxin and metrazol. Barlow<sup>7</sup> says "An optimal sequence of agents for use in emergencies of respiratory depression or arrest would be a combination of both metrazol and picrotoxin. This sequence would result in a marked and prompt stimu-

lation (ten to thirty minutes) of respiration by metrazol, which in turn would be summated slightly and prolonged by the additional medication with picrotoxin." (These statements are based on animal experiments). Koppányi recommends metrazol, 400 mg., and picrotoxin, 5 to 10 mg., in the treatment of human beings.

Even more important are measures designed to prevent the temperature from becoming subnormal. External heat is valuable here. Not only so, but it assists the action of the remedies employed and tends to prevent that lowering of resistance which conduces to the development of pneumonia. Constant and intelligent nursing, also, is indispensable.

An excellent review of the whole subject by Michel Pijoan can be found in the *Am. J. of Med. Juris.*, 1939, 2: 301. A.G.N.

6. ORFORD, T. J.: Poisoning from derivative of barbituric acid (Dial), *Canad. M. Ass. J.*, 1934, 30: 65.  
7. BARLOW, O. W.: *J. Pharmacol.*, 1935, 55: 1. *Idem, J. Lab. & Clin. Med.*, 1937, 23: 601.

## SEASON AND DISEASE

IN epidemiology the seasonal fluctuation of disease is an interesting and significant phenomenon. It is well known that most communicable diseases have a season of maximum morbidity, and many people have their private theories as to why this is so. But many non-communicable diseases also have their characteristic seasonal ebb and flow, as judged by mortality statistics.

It has been said that "Epidemic disease in a community depends primarily upon the existence of a strain of organism which is virulent in character or capable of assuming exalted virulence and upon the presence of a certain ratio of susceptible persons who react positively, so that the normal balance between resistance and infection is disturbed." Added to this must be mentioned a third factor in certain diseases, namely, the existence of a vector capable of bringing the infecting agent and the susceptible host in contact.

It may be assumed that seasonal and periodic fluctuations of disease are due to environmental influences acting on the infecting agent, the vector, or the host, or all three. If this assumption is correct a study of the rôle of environmental factors might give valuable clues as to the control of these diseases. The study of seasonal influences

in poliomyelitis, for example, might provide very helpful epidemiological facts. For poliomyelitis has a most characteristic seasonal incidence which probably varies from place to place, but is exceedingly constant in a given place. In Canada one can predict with confidence that if an epidemic of poliomyelitis is to occur it will occur in July, August and September. Just why this happens we do not know. It could be explained on the hypothesis that the disease is spread by some insect which is killed or made dormant by low temperatures. But if this were true then a subsidiary factor would have to be postulated, since cases of poliomyelitis actually do occur in the cold months of the year.

In the case of non-communicable diseases, like heart disease and diabetes, the reason for a seasonal fluctuation is even more obscure. One might imagine the heat of summer to be especially trying to cardiac cases, but actually the peak of mortality is in the winter months when people with failing hearts can more readily be protected against the elements.

The phenomenon of season and disease has its national characteristics too. A recent publication of the Medical Research Council

of Great Britain<sup>1</sup> is of interest in this connection. Here has been compared in great detail the seasonal fluctuation of disease in Great Britain and the United States. Mortality from all causes, when standardized as to age, is considerably higher in the winter in England and Wales and considerably higher in the summer months in the United States. The average experience for the year gives England and Wales a slightly lower mortality. The New England States may be considered to have a climate more nearly approaching that of England than some other parts of the United States. When the mortality of these States is studied and compared with that of England and Wales it is found that the winter disadvantage of England and Wales persists but the summer advantage is considerably reduced.

What causes the relatively high winter mortality in England? Actually it is compounded of a number of causes. Some diseases show a relatively low mortality in the winter. The diseases which have their high peaks in winter in England and Wales, and which contribute greatly towards the excess mortality as compared with the United States, are: bronchitis and pneu-

monia, respiratory tuberculosis, and influenza. Measles, whooping-cough and meningitis belong to this group too, but their influence is less marked. It is to be noted that all these diseases except influenza are in the controllable group.

The diseases which are responsible for the marked superiority in mortality in England and Wales in the summer months are notably the gastro-intestinal group (typhoid and dysentery), malaria, which of course is not much of a factor in England, and accidents. Here again we run into a group of preventable diseases and in some respects we see a picture of the differences in public health thought in the two countries. In England more stress has been laid on sanitation and less on immunization and early treatment.

Apart from the seasonal differences in mortality, this study of the Medical Research Council brings out facts which are not often stressed: such facts, for example, as the relatively high mortality in England from respiratory diseases and the relatively low mortality from chronic diseases like heart disease, nephritis and cerebral haemorrhage and softening. Deaths from violence too are nearly twice as many in the United States as in England. These statistical facts are not without significance from a public health point of view.

FRANK G. PEDLEY.

1. A Comparative Study of the Seasonal Incidence of Mortality in England and Wales and in the United States of America, E. Lewis-Faning, Special Report Series No. 239, the Medical Research Council, His Majesty's Stationery Office, London.

## Editorial Comments

### Social Conditions and Tuberculosis

It is now a familiar fact that within the last seventy years and more there has been a steady decline in the mortality from pulmonary tuberculosis. In most civilized countries this decline has never been seriously retarded, and it is still going on. It does not follow, however, that this decrease has occurred equally in all groups of the population. It has been noted in Great Britain that for some years it has not applied to the young adult group. This phenomenon has attracted a good deal of attention, and a study of it is contained in a recent report by the National Association for the Prevention of Tuberculosis.<sup>1</sup>

It was obvious that no one factor would be enough to explain this retardation. The points

to be borne in mind were as follows. (1) It affected young women more than young men. (2) In the country as a whole it began to show itself about 1901 to 1905 for young women, and about 1913 for young men. (3) It has shown signs of coming to an end in 1933. (4) Diseases other than respiratory tuberculosis have not shown the same degree of retardation. (5) It has affected all parts of the country, but the urban much more than the rural centres. (6) The areas most affected are in general those with the worst housing. Indeed, amongst some of these there was an actual increase in the mortality amongst young women between 1911 and 1933.

The Report deals in detail with each of these points, but the main features of their findings may be given as follows. Up to 1900 there was a steady improvement in the standard of living, and this was coincident with the fall in mortality from tuberculosis. This improvement,

1. HART, P. D. AND WRIGHT, G. P.: Tuberculosis and Social Conditions in England, National Association for the Prevention of Tuberculosis, 1939.

however, was checked at about 1900, and subsequently was only very slow. It was gauged mainly by the course of "real earnings", which was taken as the main determinant of the standard of living. The curve for this exactly followed that of the tuberculosis mortality.

After 1900 the number of young women in industrial occupations began to increase, tending to bring them into contact with large numbers of persons, as well as putting them under extra physical strain. Another feature was a set-back in the bettering of housing conditions of the country as a whole, until some time after the war.

It is suggested, indeed it is difficult to avoid the conclusion, that these social changes (in standard of living, housing, and volume and type of occupation) exerted a selective effect on young adults. It is significant, in addition, that during this period there was no corresponding retarding of the decline in mortality from diseases other than tuberculosis amongst young adults. The evidence is against the theory that the retardation in mortality decline for young adults has been due to decreased tubercularization in childhood, with consequent reduced immunity in adolescence.

From 1933 onwards the retardation is regarded as having ceased. This is thought to be due largely to an acceleration in the building of new houses, but the period is too short for definite conclusions. What the result of this present war will be cannot be foreseen. This report shows beyond question, however, how closely social factors are linked with the reduction in tuberculosis mortality. H.E.M.

#### Messrs. Bausch and Lomb and the Canadian War Effort

In the issue of June, 1940, page 609, the *Journal* published as a news item in its section

"University Notes" a resolution passed at a meeting of the Medical Faculty of Dalhousie University in which the position of Messrs. Bausch and Lomb in relation to the Canadian war effort was pilloried. The firm immediately protested that the resolution did them an injustice, for reasons which they gave, and asked that the Canadian Medical Association inquire into the incident. Under instructions from the Executive Committee our Association made such investigations as it was enabled to do in respect to the whole matter, and finally had presented to it by the Dalhousie University a copy of a resolution passed by the Senate of that University in December, which reads as follows:

"Whereas the Senate of Dalhousie University, having further information, has reconsidered its resolution of May 11th last, and feels that the statement contained in that resolution is inaccurate;

"And whereas the Senate has been impressed by the recent public letter of the Honourable C. D. Howe, testifying to the contribution of the firm of Bausch & Lomb to Canada's war effort;

"Be it resolved that the Senate of Dalhousie University withdraw its resolution of May 11, 1940, and, further, that a statement of its present action be sent to the firm of Bausch & Lomb and to all other Canadian colleges previously notified."

Having reviewed all the facts and the evidence before it, it was duly moved, seconded and carried in Committee of the Canadian Medical Association that,

"Whereas our *Canadian Medical Association Journal* has published an item emanating from Dalhousie University, commenting upon Messrs. Bausch & Lomb, the *Journal* be now asked to give equal publicity to the matter by publishing the resolution passed in December by the Senate of Dalhousie University rescinding its former resolution on the same subject, and that the General Secretary be instructed to notify Messrs. Bausch & Lomb of our action; and that a copy of the *Journal* containing the resolution referred to above be sent to Messrs. Bausch & Lomb." A.G.N.

Describing investigations into the properties of glass variously protected, in a recent issue of the *Journal of Scientific Instruments*, Dr. H. Moore states that a sheet of glass of 1/8 in. thickness, if protected by millboard of good quality of 1/16 in., requires before it is fractured two and a half times the force it would require if it was uncovered. In most cases glass bursts outwards. It breaks as a result of being bent inwards during the high-pressure wave, but the segments do not appreciably separate until the pressure excess has given place to the subsequent rarefaction, which occupies a much longer period, and during this period the pieces of glass are sucked forward and fall outwards. Short of blocking up

a window with brickwork or enclosing it in shutters of heavy timber or stout steel it is impossible to safeguard glass from fracture. The simplest method of reducing personal injury from flying fragments, and one available for most domestic windows, is the drawing of heavy curtains, which should hang freely so that they can swing inwards. By "lengthening the time of blow" in this way the risk of fragments cutting through the fabric is reduced, and there is a reasonable chance that they may be stopped harmlessly as the curtain swings away from the window. The same applies to wire netting stretched on window frames inside the window some 3 or 6 in. from the glass.—Abs. in *Brit. M. J.*

## Special Article

### THE VITAMIN CHART

Compiled by L. B. PETT

*Department of Biochemistry, University of Alberta*

Patients showing vitamin deficiencies fall in 3 categories: 1. *Inadequate diet*—Including the results of poverty, fads, old age, ignorance, psychopathia, lack of interest, and perhaps alcoholics, and those on special diets. 2. *Abdominal conditions*—These may be intestinal obstructions, or involve the mucosa (sprue, etc.) or be cases of chronic hepatic or cholecystic

disease. 3. *Post-operative*—Surgery often precipitates a long-developing condition, as in B complex or K deficiencies. *Vitamin therapy*—Must use large doses, and some effect should be noted in a week or two, if it is to be expected. There is little storage of vitamins K, C and the B complex. The *Fat-soluble vitamins* are A, D, E, K, T, and must be accompanied by bile salts if there is possibility of poor fat absorption. The *Water-soluble vitamins* are—the B-complex, C, P, K and may be given orally, intravenously or intramuscularly. All vitamins seem to be needed for normal growth.

Vitamin	Evidence of deficiency	Diagnostic tests	One International Unit (1 gamma = 1/1000 mg.)	Daily need in International Units or mg.	More important food sources	Therapeutic dose and remarks
A Fat-soluble, Pure form is yellow oil; known structure.	Delayed regeneration of visual purple (night-blindness); lower resistance to infections; epithelial keratinizations; asialia; xerophthalmia.	1. Visual tests for subnormal dark adaptation. In Pett test, 10 secs. and less is normal. 2. Blood analysis (20 c.c.) Normal blood = 60-100 I.U./100 c.c. Carotene = 15-45 γ/100 c.c.	0.6 γ of Beta carotene 1 mg. = about 1,700 I.U.	Child 3,000; Adult to 10,000. No toxic overdose. 1 tsp. standard cod liver oil contains about 2,100 I.U.	More than 1,000 I.U. per ounce or 3,000 per 100 g. in: apricots, broccoli, carrots, chard, kale, lettuce, liver, parsley, red peppers, spinach, sweet potato.	35,000 to 100,000 I.U. daily. Daily need varies with age, occupation, liver function, basal metabolic rate. Direct application for burns, pruritus, etc. is recommended.
B <sub>1</sub> <i>Thiamin HCl</i> Aneurin Water-soluble. Pure white xls. Synthesized.	Neurasthenia, anorexia, disordered intestinal function. Peripheral neuritis. Edema. Cardiac changes. Beri-beri. Usually tachycardia. Hypochromic microcytic anaemias (and B <sub>6</sub> ?)	1. Blood or urine tests for bisulfite binding substance show disease. 2. Tests for excretion of vitamin in urine in normals. Normal blood: 6-16 γ/100 c.c.	3 γ 1 mg. is 333 I.U.	Child 100-200. Adult 300-600. No toxic overdose. Depends on body weight, CHO intake, metabolic rate.	More than 25 I.U. per ounce or 82 I.U. per 100 g. in: dried beans, cornmeal, eggs, liver, molasses, oatmeal, green peas, peanuts, walnuts, whole wheat.	10-100 mg. orally, intravenously or intramuscularly daily. Functions as a coenzyme in carbohydrate metabolism. Needs increased in pregnancy, infections, hypermetabolism, anaemia, alcoholism. Used in neuralgias, toxæmias of pregnancy.
B <sub>2</sub> Complex (G) 1. Riboflavin Water-soluble. Pure yellow xls. Synthesized.	Simple def. is rare. Usually with other B complex. Fissures at mouth corners or cheilosis. Seborrhœic dermatitis. Superficial corneal inflam. Photophobia. Some anaemias.	Uncertain. Normal blood content (?) 2 γ/100 c.c.	None.	Uncertain, 1 or 2 mg.? No toxic overdose.	Small amounts in most foods. More than 25 γ per ounce or 82 γ per 100 g. in: cabbage, cornmeal, eggs, honey, liver, milk, peas, spinach, tomatoes. Green leaves are good.	5 mg. 3 to 5 times daily. Functions in intracellular oxidation processes.
B <sub>2</sub> Complex (G) 2. Nicotinic Acid Water-soluble. Pure white xls. Synthesized.	Simple def. is rare. Pellagra: dermatitis with pigmentation. Gastro-int. disturbances, including saliva changes, stomatitis and diarrhoea. Porphyuria. Urethritis. Dementia.	Excess normally excreted in urine, where readily detected. Absent in subclinical and clinical pellagra.	None.	Uncertain, 25 mg.? Possible toxic overdose (1 g.)	Small amounts in most foods. Yeast 60 mg./100 g. Liver 12 mg. Whole wheat 5 mg. Peas 1 mg.	500 mg. orally, or 1.5 mg./kg. body weight intravenously daily. Deficiency likely only on diets restricted to few foods.
B <sub>2</sub> Complex (G) B <sub>6</sub> 3. Pyridoxine or Adermin Water-soluble. Pure white xls. Synthesized.	Simple def. is rare. Nervousness, insomnia, abdominal pains, irritability, weakness. Perhaps muscular dystrophies. Mostly as part of other disease.	Therapeutic.	None.	Uncertain. Possible toxic overdose.	No analyses available. Yeast, liver, bran, and whole grains.	50-150 mg. intravenously or subcutaneously at 1 week intervals. Used with E in pseudohypertrophic muscular dystrophy.

## THE VITAMIN CHART—Continued.

Vitamin	Evidence of deficiency	Diagnostic tests	One International Unit (1 gamma = 1/1000 mg.)	Daily need in International Units or mg.	More important food sources	Therapeutic dose and remarks
B <sub>2</sub> Complex(G) 4. <i>Pantothenic Acid</i> Water-soluble. Pure white xls. Synthesized.	Deficiency as a complication of other B-complex deficiency states. Pellagra, beri-beri, polyneuritis.	Therapeutic.	None.	Uncertain.	Priv. comm. from Dr. T. H. Jukes: Micrograms or $\gamma$ per gram edible form: Dried yeast 200, liver 40, egg yolk 63, eggs 27, molasses 70, broccoli 11, sweet potatoes 11, lean beef 10, bran 24, split peas 21, rolled oats 11, wheat 11, barley 10, soya bean meal 14	50-200 mg. daily.
C <i>Ascorbic Acid</i> <i>Ceritamic Acid</i> Water-soluble. Pure white xls. Synthesized.	Subclinical states shown by diagnostic tests. Scurvy: petechial hemorrhage (gums and subperiosteal). Weakness. Painful joints. In children edema and tenderness. Loosening of teeth. Capillary permeability increased.	1. Blood plasma analysis: below 0.5 mg. per cent is scorbutogenic. 2. Urinary excretion. Normally 15-50 mg. in 24 hrs. averaged diet. 3. Saturation test. 4. Capillary fragility not reliable.	50 $\gamma$ . 1 mg. = 20 I.U.	Child 25 mg. Adult 25-100 mg. No toxic overdose.	Mg. per 100 g. (3½ oz.) Apples 0-10; asparagus 0-25; beets 5-8; cabbage 2-30; celery 1-5; cherries 1-5; cranberries 3-20; grapefruit 30-50; juice 5-50; oranges 10-60; juice 40-80; potatoes 20-50; tomatoes 5-30; juice 0-25.	200-400 mg. orally or intravenously. Increase in fevers, gingivitis, normocytic anemia, arsenical dermatosis, psoriasis, tuberculosis, colitis, whooping cough.
D Fat-soluble. D <sub>2</sub> or calciferol is synthetic. D <sub>3</sub> is natural in fish oils. Known structure.	Rickets, osteoporosis, osteomalacia. Infantile tetany. Spasmophilia. Dental caries? Deficiency noted chiefly if Ca and P in diet inadequate or unbalanced.	1. X-ray. 2. Serum phosphatase in some instances. 3. Serum Ca and P.	0.25 $\gamma$ calciferol. 1 mg. = 40,000 I.U. Dangerous dose over 150,000 I.U.	Child 500-1,000. Adult? 300. Greatly increased in pregnancy and lactation.	Food sources poor. Irradiation of foods not recommended. Salmon, sardines, 5,000 I.U. per 100 g. Egg yolk 15-500 I.U. Milk 5 I.U.	In infants up to 500,000 I.U. have been given. U.S. Pharmacopoeia XI Unit is same as International. Massive dose in arthritis of uncertain value.
E <i>Tocopherol</i> Fat-soluble. Yellow oil. Synthesized.	Disordered reproductive function. Amyotrophic lateral sclerosis, pseudohypertrophic muscular dystrophy.	None.	None.	Uncertain. No toxic overdose.	Leafy vegetables, wheat germ.	Prophylaxis in pregnancy 15 c.c. wheat germ oil or 120 mg. daily. Used with B <sub>6</sub> in muscular dystrophies.
K Phylloquinone. Fat-soluble. Water-soluble. Several are known, pure. Synthesized.	Prolonged clotting time from decreased prothrombin. Used pre-operatively in jaundice; also in chronic infections, peptic ulcer, cirrhosis, ulcerative colitis, cachexia.	Prothrombin test in plasma. Should be 75 per cent or over for safe operating.	None. 0.05 $\gamma$ is 1 Dam. unit.	Uncertain.	Alfalfa, cabbage, spinach, tomato, animal fats, green leaves of all kinds.	50,000 to 100,000 Dam units plus 1 g. bile salts. (1-5 mg.) daily. Water-soluble forms are used intravenously or orally without bile.
P <i>Hesperidin</i> . Water-soluble. Pure yellow xls. Known structure.	Decreased capillary resistance, with vitamin C. Vascular purpuras. Arsenic and bismuth toxicoses.	None.	None.	Uncertain.	Lemons, especially skin.	50-200 mg. daily orally or intravenously.
T Unknown chem.	Thrombocytopenia. All bleeding with low platelet count.	Therapeutic: Platelet count response.	None.	Uncertain.	Unknown except in sesame oil.	0.5 to 1.0 c.c. sesame oil daily.

## Men and Books

### BUCKE AND OSLER: A PERSONALITY STUDY\*

By G. H. STEVENSON

*London, Ont.*

I am happy to have the privilege of bringing to your attention some of the points of resemblance and of difference in the personalities, the lives and achievements of two of our greatest Canadian physicians, Richard Maurice Bucke and Sir William Osler.

The circumstances of this presentation today are especially appropriate, surrounded as we are now by many of Osler's collections and writings, and in the actual presence of Dr. Bucke's daughter, Mrs. Seaborn, and his son-in-law, Dr. Edwin Seaborn, who presents the next paper. I am fortunate also in being able to present as a part of this paper six hitherto unpublished original letters from Osler to Bucke, which have been kindly loaned to me by a son of the latter, Mr. Harold L. Bucke.

It is probable that the medical profession is better acquainted with the life of Osler than of Bucke and for that reason the following few paragraphs are quoted from a paper dealing with the life of Bucke and read before the Ontario Neuropsychiatric Association on the 100th anniversary of the birth of this outstanding Canadian psychiatrist, based largely on Coyne's biography of Bucke.<sup>1, 2</sup>

"Richard Maurice Bucke was born on the 18th of March, 1837, at Methwold, England, his father being an Anglican cleric, the Reverend Horatio Walpole Bucke, through whose mother the family tree extended to Sir Robert Walpole, the first Earl of Orford, Prime Minister of England from 1721 to 1742; various members of which family had made in successive generations outstanding achievements, particularly in the realms of politics and letters. Certain members of the Bucke line had also achieved distinction, notably Charles Bucke, author of 'Beauties of Nature' and 'Ruins of Ancient Cities'. Dr. Bucke's mother was Clarissa Andrews, whose brother, Biggs Andrews, Q.C., was a noted lawyer.

"We do not know the reasons which impelled this clergyman, master of seven languages, to resign his parish and bring his wife and family to Canada in 1838, when the subject of this sketch was an infant. The family settled on a pioneer homestead, practically adjoining the site on which later was erected the mental institution over whose destinies Richard Maurice Bucke was to preside for a quarter of a century. His mother died when he was only seven. His father remarried and the stepmother lived only until he was 16.

"During these boyhood days he appears not to have attended school, but in his father's study he read voraciously and probably secured a much better education than is usually acquired by formal schooling. He helped with the work on the farm and even during these years was deeply interested in the problems of religion and philosophy.

\* Read at the Seventy-first Annual Meeting of the Canadian Medical Association, Section of Historical Medicine, Toronto, on June 19, 1940.

"Following the death of his stepmother, being only 16 at the time, he decided to leave home and see something of the world, and during the next five years he led a wandering adventurous existence, in which hardship and acute physical suffering played no small part. The same bold and vagrant urge which impelled his father to leave the comfort of the English countryside appears to have been responsible for driving this son into the wilderness for these five years. This period of his life, filled with high adventure, is difficult to reconcile with the studious, methodical dignitary he became in later years.

"During this time he worked for three years in the Ohio and Mississippi valleys, working at any employment that he could get—gardener, farmhand, railroad employee, making staves in the cypress swamps of Louisiana, fireman and deck hand on steamboats on the rivers. He then went farther west to Salt Lake City with a pack train, the old-fashioned covered wagon. Continuing farther west with a smaller party, they were attacked by Indians and suffered acutely for lack of food and water. He worked for a year as miner in the Nevadas.

"In the fall of 1857, on a silver mining mission, which if it had ended more happily, might have made him a millionaire, he and the miner friend with him met misfortune in the nature of a blizzard and were snow-bound in the Sierras. After terrible sufferings, he and his partner, Allen Grosh, reached a mining camp. Grosh became delirious and died 12 days later. Bucke was in a serious condition, both feet were frozen and had to be amputated, so that for the rest of his life he was obliged to use artificial feet. After several months' convalescence the miners sent him to San Francisco. He evidently felt he had had enough adventuring and decided to return to Canada, presumably to settle down to a steadier and less dangerous existence.

"His mother had left him some money and he used this to pay his expenses as a student in medicine at McGill University, graduating in 1862 and winning the prize for the best thesis, entitled, 'The Correlation of the Vital and Physical Forces,' which was printed in the *British-American Journal*. He read much outside of medicine, particularly philosophy and poetry.

"His later writings were to show how these studies broadened his knowledge and increased his culture. He spent a year in Europe doing post-graduate work, returning to Canada and establishing himself in general practice in Sarnia in 1864. A year later he married Jessie Maria Gurd. He continued in general practice in Sarnia until 1876, presumably with fair success and taking an active interest in the social and political life of the times, becoming a close personal friend of Timothy Blair Pardee, at that time Provincial Treasurer, who appointed Bucke to the superintendency of the newly opened Hamilton Asylum in 1876. He was transferred to the superintendency of the London Asylum in February, 1877, on the death of Dr. Landor.

"It will be seen that he came to this position with no special knowledge of psychiatry but with high intelligence and ideals, a rich background of experience and a keen interest in all things pertaining to the mind. The appointment was a particularly fortunate one and was more than justified by the success attending his efforts as an asylum administrator and as a courageous, independent thinker and idealist."

Dr. Bucke continued in the superintendency of the Ontario Hospital, London, until his death in 1902. He was eminently successful as an administrator and in the improvements he made in methods of care and treatment of the mentally ill, notably for the elimination of restraint, the introduction of recreational therapy on a scale

not previously attempted, and for his insistence on thorough physical examination and treatment, especially gynaecological.

He was honoured by election to the Royal Society of Canada, to the Presidency of the psychological section of the British Medical Association, and the Presidency of the American Medico-Psychological Association (now the American Psychiatric Association). He was the first professor of nervous and mental diseases at the University of Western Ontario.

His work as a psychiatrist and mental hospital administrator might appear to have fully occupied him but he had other interests equally worthy of note. He had outstanding literary and scientific accomplishments which led him to interesting and valuable papers and three books, entitled, "Man's Moral Nature",<sup>3</sup> "Walt Whitman",<sup>4</sup> and "Cosmic Consciousness,"<sup>5</sup> the last of which is the most noted and will probably remain as a permanent, if little known, monument to his wide reading and study, his rather mystical psychology, and his devotion to his hero, Walt Whitman. Whitman, in person and through his "Leaves of Grass" gave Bucke a revelation of life and religion which was the major influence in his life and inspired his chief literary productions.

The outstanding events of Osler's life are probably better known to you—his birth and early life in a pioneer clergyman's home at Bond Head, his limited schooling opportunities when young, followed by attendance at private schools at Barrie and Weston, Trinity College School; his early interest in natural science, University of Toronto, and then to McGill where he graduated in medicine. This was followed by post-graduate work in Europe, his return to the staff of McGill, then to the University of Pennsylvania, and then as first Professor of Medicine at the newly organized Johns Hopkins University at Baltimore. His call to Oxford as Regius Professor of Medicine followed, and he served as consultant to the British and Canadian hospitals in the latter years of the war. His great textbook of medicine was first published while at Baltimore in 1891 and has passed through many editions.

There are a number of interesting resemblances as well as differences in the lives of these men we honour today. They had unusual and outstanding ancestors. One of Bucke's ancestors was Sir Robert Walpole, and other relatives had definite literary and scientific interests. Osler's ancestors were merchants and seafaring people, some having also definite literary achievements. Both were sons of Church of England clergymen. Before entering the Church Osler's father, Featherstone Osler, had however been an officer in the British Navy, preceded by reckless adventures as a junior in various parts of the Seven Seas. Having made up his mind to become a clergyman, he entered into his studies earnestly and quite willingly selected the hard lot of a

pioneer missionary in Upper Canada. He was subsequently described as "a reticent sort of man, English to the backbone, who seldom let himself go."<sup>6</sup> Osler more closely resembled his mother, physically and as to temperament. Ellen Pickton Osler is described as "wiry, short, slender, very dark. She was a very pretty girl, clever, witty and lively, with a power of quick repartee, wilful but good-tempered, not easily influenced, very faithful in her friendships and of strong religious principle."<sup>6</sup>

Bucke's father, Reverend Horatio Walpole Bucke, appears to have been more the mystical and studious type, less vigorous and less practical, but a great scholar and linguist, being master of seven languages. Why he should have given up the church to become a pioneer farmer is not known. He brought several thousand books with him, so one may assume his literary interests persisted, but he does not appear to have continued in the ministry. We have little information as to Bucke's mother. She appears to have been a faithful and devoted mother, giving birth to seven children, but she died when Richard Bucke was only seven years of age. His father subsequently re-married.

It might be noted that Osler's parents were determined to give all their family every educational opportunity, whereas Bucke had no formal education whatever, never attended a primary or secondary school, picking up his education from his environment and from his father's richly furnished library. The tremendous thirst for knowledge and reading, common to both Bucke and Osler, is shown to be not so much due to ordinary teaching methods but to the ambition and energy and initiative they had in common.

The two families came to Canada from England at about the same time, Osler's parents in 1837, Bucke's parents and family in 1838, Bucke himself having been born in 1837. It is interesting to note that both Osler and Bucke were much influenced by a pre-Darwinian book called "Vestiges of Creation". This book may have had a different effect on the two boys, turning Bucke's mind to the larger aspects of space and cosmic force, and turning Osler to a study of the phenomena of nature at close range, as indicated by his very early interest in the microscope and microscopic findings. Both were genuinely religious, Osler almost entering the church, but their religious views were not identical.

Both subsequently studied medicine at McGill, graduating with high honours. They studied abroad before settling in Canada, Osler at Montreal and the staff of McGill, Bucke returning to Sarnia and private practice. Both developed fine literary qualities and produced books that will endure; both were honoured by the highest offices in scientific bodies; both suffered greatly in later life by the death of a beloved son.

While the similarities in their lives and accomplishments are remarkable, there were very marked personality differences, leading them in totally different directions. The temptation is strong to attempt an explanation of their differences on endocrinological grounds (following Berman<sup>7</sup>) but such speculations might not be fully warranted. We shall not go far astray, however, in emphasizing inheritance, Bucke resembling his father, the mystical, impractical, emotional and unusual father; Osler resembling his mother, the practical, religiously orthodox, humorous, devoted mother. And as boys we see the men being formed; Bucke the introvert, studious, meditating on the vague imponderables, the meaning of God, immortality, eternal suffering; "he was subject at times to a sort of ecstasy of curiosity and hope concerning the future life."<sup>11</sup> At the same age Osler was actively extraverted, loved group activities, games and practical jokes. He had a sunny disposition, was friendly with his group, a torment to his teachers, especially those who could easily be tormented. His mischievous horse-play led to his expulsion from the School of Dundas at 15, and later at Weston School, when 17, to his arrest and detention in gaol for a few days.

The maturing process in these two boys was strikingly different. Osler's energy, vitality and ambition and education proceeded along orderly lines, guided and influenced by devoted and intelligent parents and teachers. Each step appeared the inevitable result of a preceding step, almost predictable in advance. Not so with Bucke; a stormy childhood apparently unguided led to a still more stormy adolescence and at 16 we see him leaving home, and for the next five years leading a tramp-like, adventurous existence in all parts of the United States, almost losing his life on more than one occasion and finally having both feet so badly frozen that they had to be amputated. We are not told what were the motives that led him to spend these years in the wilderness. We can only surmise that some deep-seated emotional stresses forced him on. Perhaps only the injury to his feet was responsible for saving him from an utterly wasted life, for he returned to the parental roof, soon after entered McGill, and from this time on to the end of his life his development was orderly and progressive, although adventures in the spiritual realm still awaited him.

And in manhood both grew, but in different directions, as their earlier personality differences might have indicated. Osler was always the keen, aggressive, friendly extravert, working hard, increasing his knowledge, intensely practical, teaching, writing, forming an increasing circle of friends, becoming more and more recognized as the continent's leading clinical investigator and teacher; always reliable, dependable, reasonable, careful, taking nothing for granted. His sense of humour, searching energy and good

judgment never deserted him. In psychological language he was a well-integrated, well-balanced personality, extravert, syntonic, living in these upper regions of normalcy which are the envy of those of us who live at lower levels, but only a few steps away from those grades of activity and elation which are regarded as abnormal, or better, hypernormal. Berman would probably attribute his mental and physical characteristics to a well organized and harmoniously operating endocrine system, with hyperadrenalinism and hyperthyroidism and an excellent anterior pituitary controlling a well-developed (but not overdeveloped) posterior pituitary.

Bucke is a different sort of personality. The turbulent and unsatisfied emotional state of childhood and adolescence, coupled with very high intelligence, led him to ask questions and seek answers as to the riddle of existence, the meaning and purpose of life. True, he was a very superior practitioner of medicine and leading psychiatrist, but these did not give him the satisfaction that Osler's work gave to him. Bucke was still reaching out for ultimate causes and deeper meanings. After years of waiting and study he finally found them in the person and writings of Walt Whitman. His deep-seated religious doubts and cravings were removed and satisfied by a double conversion, which forever after gave a fullness of living and of meaning. These conversions were first to Walt Whitman, the man, whom he regarded as the greatest religious leader of all time, superior even to Jesus Christ. Whitman's volume, "Leaves of Grass" was to him the holy writings of the new religion. The second conversion was related to the first and actually preceded it; a peculiar phenomenon, which he described in the following words:<sup>5</sup>

"He and two friends had spent the evening reading Wordsworth, Shelley, Keats, Browning, and especially Whitman. They parted at midnight and he had a long drive in a hansom cab. His mind deeply under the influence of the ideas, images and emotions called up by the reading and talk of the evening, was calm and peaceful. He was in a state of quiet, almost passive enjoyment. All at once, without warning of any kind, he found himself wrapped around as it were by a flame-coloured cloud. For an instant he thought of fire, some sudden conflagration in the great city, the next he knew that the light was within himself. Directly afterwards came upon him a sense of exultation, of immense joyousness, accompanied or immediately followed by an intellectual illumination quite impossible to describe. Into his brain streamed one momentary lightning flash of the Brahmic-Splendor which has ever since lighted his life; upon his heart fell one drop of Brahmic Bliss, leaving thence onward for always an after taste of heaven.

"Among other things he did not come to believe, he saw and knew that Cosmos is not dead matter, but a living Presence, that the soul of man is immortal, that the universe is so built and ordered that without any peradventure all things work together for the good of each and all; that the foundation principle of the world is what we call love, and that the happiness of every one is in the long run absolutely certain. He claims that he learned more within the few seconds during which the illumination lasted than in the previous months or even years of study, and that he learned much that no study could ever have taught."

The sensory vividness of this experience, the like of which had never previously occurred to him, was so marked and the feeling of insight and knowledge of the Cosmos so great that Bucke regarded it as an actual glimpse into the mind of the Cosmos, not as a supernatural phenomenon but as an achievement of a specially endowed and specially developed personality. He made a study of similar phenomena in the lives of a number of other historical figures, most of whom were deeply religious and mystical, and set forth his conclusions and historical data in his most remarkable book, "Cosmic Consciousness".

If he had been a little more critical and objective in his attitude, and if he had realized there were related phenomena, such as the feelings of the partially intoxicated individual, the occasional effects of anaesthetics, and the states of elation achieved in religious conversions, he might have come to different conclusions. And while we cannot agree with his conclusions, nevertheless we admire the brilliance of his thinking, the fine literary qualities, and the descriptive and historical data he collected in this presentation. It is definitely a rung in the ladder leading to a fuller knowledge of unusual mental mechanisms.

Bucke became one of the coterie of disciples that gathered about Whitman. He wrote and spoke in defense of Whitman who was bitterly persecuted for his unusual and radical views as expressed in "Leaves of Grass". He became the St. Paul of the new religion, even going so far as to imitate the rather unusual garb of Whitman.

I am not aware that Bucke ever put in writing his opinion of Osler (although Whitman disliked Osler's attitude), but they had correspondence from time to time. In Whitman's serious illness from 1886 to 1888, at which time Osler was in Philadelphia and Whitman in Camden, just across the Delaware River, Bucke asked Osler to assume the treatment of Whitman, advising Whitman that Osler was the most competent physician available. We have, however, Osler's comments on and opinion of Bucke as related in Cushing's biography:<sup>6</sup>

"That evening at the Club after dinner I opened the volume of 'Leaves of Grass' for the first time. Whether the meat was too strong, or whether it was the style of cooking—'twas not for my pampered palate, accustomed to Plato and Shakespeare and Shelley and Keats. This has been a common experience; even Dr. Bucke acknowledging that 'for many months I could see absolutely nothing in the book', and would even 'throw it down in a sort of rage'. Whitman himself has expressed this feeling better than anyone else, speaking of his 'strange voice', and acknowledging that critics and lovers of poetry may well be excused the 'chilly and unpleasant shudders which will assuredly run through them, to their very blood and bones' when they first read him, and exclaim: 'If this is poetry, where must its foregoers stand?' . . . At this time, of the two men, Bucke interested me more. Though a hero-worshipper, it was a new experience in my life to witness such an absolute idolatry. Where my blurred vision saw only a fine old man, full of common sense and kindly feelings, Bucke

felt himself in the presence of one of the world's great prophets. One evening after dinner at the Rittenhouse Club with Dr. Chapin, Dr. Tyson, Dr. J. K. Mitchell and a few others who I knew would appreciate him, I drew Bucke on to tell the story of Whitman's influence. It was an experience to hear an elderly man—looking a venerable seer—with absolute abandonment tell how 'Leaves of Grass' had meant for him spiritual enlightenment, a new power in life, new joys in a new existence on a plane higher than he had ever hoped to reach. All this with the accompanying physical exaltation expressed by dilated pupils and intensity of utterance that were embarrassing to uninitiated friends. This incident illustrates the type of influence exercised by Whitman on his disciples—a cult of a type such as no other literary man of our generation has been the object. . . ."

How shall we describe Bucke's personality? In terms of intelligence it was fully the equal and possibly superior to Osler's. But it was a different kind of intelligence, having more vision and less logic than Osler's. Whereas Osler's intelligence might be called deductive and practical, Bucke's was intuitive and abstract. Osler's intellectual products were built carefully and orderly and reasonably and at close range. Bucke was more the philosopher, dealing with tremendous ideas and concepts, and because of his marked subjectiveness and "will to believe", as contrasted with Osler's objectiveness, he sometimes came to conclusions somewhat illogical. That he is capable of profoundly logical reasoning, however, is shown in certain chapters of his book "Man's Moral Nature", where he deals with demonstrable settings rather than theories.

Bucke was a man of few close friends; intensely individualistic, opinionated, mystical, deeply, if unorthodoxly, religious. His experience of "Cosmic Consciousness" gave him the feeling of being set apart and more highly developed than most humans. The depth of his religious and cosmic feeling must have hindered the development and expression of humour. Two of his contemporaries who knew him intimately tell me they never knew him to make a joke or to show any interest in humorous situations. His son-in-law, Dr. Seaborn, feels that he had a well-developed sense of humour although perhaps it was only rarely displayed. Contrast this with Osler's bubbling humour and tendency to practical jokes throughout life.

Aside from these aspects of Bucke's personality, he appears to have been definitely more introverted than Osler. Berman would probably say that the chief endocrine difference would be a more active and dominant posterior pituitary in Bucke, accounting for his deep religious and emotional attitudes, at times obscuring and over-shadowing an excellent anterior pituitary.

I do not know to what extent Bucke and Osler associated or how often their paths crossed. During Whitman's illness they met on several occasions and consulted together. Several such references are made in Harned's, "In re Walt Whitman". I have also quoted Osler's comments on Bucke and Whitman. They probably

met on various other occasions, especially at medical gatherings. Nor do I know to what extent they corresponded, but I am fortunate in having six short notes from Osler to Bucke, loaned to me for this occasion by his son, Mr. Harold Bucke. There is no doubt they respected each other highly, not over-valuing each other, and certainly not over-valuing their own worth, great as it was. The six notes from Osler to Bucke are as follows:

Baltimore, April 17th, 1899

Dear Bucke:—

I shall be delighted to subscribe for a copy of Notes and Fragments. I hope you are keeping well. I haven't heard of you for a long time.

With kind regards,

Sincerely yours,  
(Sgd.) Wm. Osler.

Baltimore, Sept. 15th, 1899

Dear Bucke:—

I enclose the five dollars, though I have not yet seen the Fragments, as I have only just returned this morning. I found several very enthusiastic Waltites in England.

I hope you are well and happy,

Sincerely yours,  
(Sgd.) Wm. Osler

9.24.01

1 WEST FRANKLIN ST.

Dear Bucke

I found your "Cosmic Consciousness" on my return today. Many congratulations, in its completion. The Dedication touched me deeply - it is one of the most beautiful books I have ever read.

Ever yours  
Wm Osler

Baltimore, Nov. 19th, 1900

Dear Bucke:—

No, unfortunately, I cannot get the whole discourse. I haven't even got a copy of it myself. It is one really of rare beauty.

If you hear of anything good in any of the early Whitman editions let me know.

Sincerely yours,  
(Sgd.) Wm. Osler

Baltimore, Dec. 10th, 1900

Dear Bucke:—

Very glad you are going to get out but not out of your Cosmic Consciousness. I shall be very glad indeed to subscribe for a couple of copies, one for myself, and one for the McGill Library.

Sincerely yours,  
(Sgd.) Wm. Osler

Baltimore, Feb. 9th, 1901

Dear Bucke:—

Glad you liked the paper in the *Sun*. Dana is to reprint all of the articles in book form at an early date.

Sincerely yours,  
(Sgd.) Wm. Osler

How is your C. C?

One of the brief notes I have read to you from Osler to Bucke comments on the beautiful dedication which opens "Cosmic Consciousness". Both of these men suffered the loss of a very dear son in their advancing years. Both bore the loss bravely, although the death of Revere, killed in action, broke Sir William's heart, and made it hard for him to carry on with his accustomed cheerfulness. Cushing quotes Osler's entry in his diary when news of his son's death was received:<sup>6</sup>

"I was sitting in my library working on the new edition of my textbook when a telegram was brought in, 'Revere dangerously wounded, comfortable and conscious, condition not hopeless.' I knew this was the end. We had expected it. The Fates do not allow the good fortune that has followed me to go with me to the grave —call no man happy till he dies. The War Office telephoned me at 9.00 in the evening that he was dead. A sweeter laddie never lived, with a gentle loving nature. He had developed a rare taste in literature and was devoted to all my old friends in the spirit—Plutarch, Montaigne, Browne, Fuller, and above all Isaak Walton, whose COMPLEAT ANGLER, he knew by heart and whose 'Lives' he loved. We are heart broken, but thankful to have the precious memory of his loving life."

Bucke's loss is recorded in the dedication referred to<sup>5</sup>—

"Dear Maurice:

"A year ago today, in the prime of youth, of health and strength, in an instant, by a terrible and fatal accident, you were removed forever from this world in which your mother and I still live. Of all young men I have known you were the most pure, the most noble, the most honourable, the most tender-hearted. In the business of life you were industrious, honest, faithful, intelligent and entirely trustworthy. How at the time we felt your loss—how we still feel it—I would not set down even if I could. I desire to speak here of my confident hope, not of my pain. I will say that through the experiences which underlie this volume I have been taught, that in spite of death and the grave, although you are beyond the range of our sight and hearing notwithstanding that the universe of sense testifies to your absence, you are not dead and not really absent, but alive and well and not far from me this moment. If I have been permitted—no, not to enter, but—through the narrow aperture of a scarcely opened door, to glance one instant into that other divine world, it was surely that I might thereby be enabled to live through the receipt of those lightning-flashed words from Montana which time burns only deeper and deeper into my brain."

"Only a little while now and we shall be again together and with us those other noble and well-beloved souls gone before. I am sure I shall meet you and them; that you and I shall talk of a thousand things and of

that unforgettable day and of all that followed it; and that we shall clearly see that all were parts of an infinite plan which was wholly wise and good. Do you see and approve as I write these words? It may well be. Do you read from within what I am thinking and feeling? If you do not know how dear to me you were while you yet lived what we call life here and how much more dear you have become to me since.

"Because of the indissoluble links of birth and death wrought by nature and fate between us; because of my love and because of my grief; above all because of the infinite and inextinguishable confidence there is in my heart, I inscribe to you this book, which, full as it is of imperfections which render it unworthy of your acceptance, has nevertheless sprung from the divine assurance born of the deepest insight of the noblest members of our race.

So long, dear boy,  
YOUR FATHER."

Osler's final link with Bucke was a paper he prepared on Bucke's hero, Whitman, his final

illness preventing its presentation. Bucke's last paper, likewise uncompleted, dealt with the Shakespeare-Bacon controversy.

So they lived and worked and joyed and sorrowed and finally died, having accomplished mightily and having set examples to inspire all of us who follow after them.

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## Association Notes

### CANADIAN MEDICAL ASSOCIATION CONVENTION WINNIPEG, June, 1941

#### Mall Hotel

Rooms:	
Single - - - - -	\$2.50 - \$3.00
Double - - - - -	\$4.00 - \$5.00

The centre of all  
Indian trails

Wigwams supplied  
only on  
request

#### Fort Garry Hotel

Rooms:	
Single - - - - -	\$3.50 - \$5.00
Double - - - - -	\$5.00 - \$7.00

Pow-wows only allowed  
in private-rooms

#### St. Charles Hotel

Rooms:	
Single - - - - -	\$1.50 - \$2.25
Double - - - - -	\$2.50 - \$4.00

Grub-stakes extra

#### CONVENTION HEADQUARTERS

#### ROYAL ALEXANDRA HOTEL

Rooms:	
Single - - - - -	\$3.50 - \$5.00
Double - - - - -	\$5.00 - \$7.00

Reservations not guaranteed until members of General Council and visiting speakers are accommodated.

#### St. Regis Hotel

Rooms:	
Single - - - - -	\$1.50 - \$2.50
Double - - - - -	\$2.50 - \$3.50

True Western  
hospitality

#### Marlborough Hotel

Rooms:	
Single - - - - -	\$2.00 - \$3.00
Double - - - - -	\$3.00 - \$4.50

Fire/water allowed  
but no fire arms

#### Clarendon Hotel

Rooms:	
Single - - - - -	\$1.50 - \$2.00
Double - - - - -	\$2.00 - \$3.00

Native costume  
not essential

All Canadian Doctors attending must be members in good standing  
of both their Provincial and Dominion Associations.

#### To the Ladies

We, the Winnipeg women of the Canadian Medical Association, wish to extend a message to you, the Canadian Medical Association ladies throughout the Dominion. We are very happy at the prospect of being hostesses to you next June, and are most anxious that our arrangements for your comfort and enjoyment

will meet with success. Already, under the chairmanship of Mrs. G. S. Fahrni, we are organized into various committees and have many plans tentatively made.

Now that we are launched into the New Year, we should like to tell you what we expect of you. It can be expressed in one word—"Come". Soon we shall all be talking of, and

planning for summer vacation trips. This year, with so many of our usual doors of travel closed, Winnipeg, and the meeting of the Canadian Medical Association in June would seem to offer the ideal solution. Winnipeg, the traditional gateway to the West, was never more open nor more welcoming. We do hope that in June, in very fact, all roads will lead to Winnipeg and be travelled by all members of the Canadian Medical Association, accompanied, of course, by their wives.

By next month's issue of the *Journal*, we hope to submit our program to you. In the meantime, keep as the motif for your summer's plans—"C.M.A. in Winnipeg in June".

#### **First Canadian Division Medical Society**

Readers of the *Journal* have already been advised of the formation in England of the First Canadian Division Medical Society. Colonel E. A. McCusker, A.D.M.S. of the Division, in a letter to the General Secretary, has the following to say: "Our Society is now functioning smoothly, and I feel great benefit is being derived from it. Meetings are being held from time to time with papers being presented by a number of outstanding members of the profession."

Colonel McCusker goes on to say that a start has been made towards the establishment of a small lending library. Further volumes are necessary, and the Society would like to have current medical journals and year books. If any of our members find it convenient to send either journals or year books to the First Canadian Division Medical Society, they may be assured that such action will be highly appreciated by that Society.

T. C. ROUTLEY

## **The War**

### **The Work of a London Emergency Blood Supply Depot**

By O. M. SOLANDT

*Director of S.W. London Blood Supply Depot*

Almost a year before war broke out the Ministry of Health began to make plans for the supply of blood for transfusions in the event of air raids on London. The Medical Research Council was asked to organize the blood supply for the London District. There was a long discussion as to whether the blood supply organization should be centralized in a few places or whether each hospital should have its own donor panel and do its own bleeding. It was eventually decided that four large depots should be set up, to supply as much as possible of the blood which would be needed in an emergency. They were all ready for action at the outbreak of war and have continued

their work ever since. It is only in the last few months that the depots have had their first real test and there is now no doubt that their existence has been amply justified.

Under the Emergency Medical Service the London Area was divided into 10 sectors. A Blood-transfusion Officer was appointed in each sector, to co-operate with the nearest depot in ensuring an adequate blood supply to all sector hospitals. The work of the sector officers has varied greatly in different sectors. In some, remote from a depot, complete arrangements for local blood supply have been made, and the depot is only called upon in a major emergency. In other sectors the work of the Blood-transfusion Officer has been entirely taken over by the depot. There has been close co-operation between depot and sector officers, and the dual arrangement has resulted in a very complete transfusion service.

The work of the depots can best be described by giving an account of a typical depot, such as the S.W. Depot. This depot was originally intended to supply blood to the hospitals of Sectors 8 and 9 under the Emergency Medical Service. These two sectors include South-West London and the whole of Surrey. The sectors are based on St. Thomas's and King's Hospitals, respectively. In this area there are more than 75 hospitals. In addition, the depot has recently taken over the responsibility for blood supply in Sussex, which includes a further 34 hospitals.

*Enrolment of donors.*—The Depot now has a panel of over 50,000 donors located in the outer suburbs of London and in towns and villages as far as 40 miles from the city. These have all been enrolled and grouped by the Depot staff. The enrolment of donors continues all the time, to make up for those who move away, and in order to have a widely scattered donor panel in case war conditions should make bleeding impossible in the area immediately around London.

*Bleeding of donors.*—About 600 to 700 donors have been bled each week since serious air raids began. About 40 per cent of this number are bled at the Depot and the remainder at outlying bleeding centres. The donors are usually called up by post-card. Should donors be needed urgently arrangements have been made for getting them from nearby factories within a few minutes. In most cases the reserve stock of blood has proved adequate to meet all emergencies. It has never yet been necessary to bleed at night and rarely on Sundays. This is one great advantage of the depot system, particularly when night transport for donors is made very difficult and even dangerous by the blackout and the barrage.

Bleeding is done by a simple gravity method into the standard M.R.C. blood bottle. This is a modified pint milk bottle. In most cases a very large needle is used. If the veins are

small a smaller needle is used and suction applied to the air outlet on the bottle. The doctors who do the bleeding have become so expert that they rarely fail to get a full bottle of blood in more than 2 cases in 100, even though no attempt is made to select donors who have good veins. The anticoagulant used is 100 c.c. of 3 per cent sodium citrate to which is added 10 c.c. of 30 per cent glucose, and 430 c.c. of blood is taken from each donor.

After being bled the donor rests for at least 15 minutes and is given a cup of tea or coffee. Donors are not bled oftener than once in three months, and the interval is usually nearly six months because so many donors are available. Donors are usually agreeably surprised by the simplicity of the procedure, and the response is always better among donors who have been bled once than among those who do not know what they are in for. About one donor in fifty faints, and occasionally very severe vaso-vagal attacks are seen. Fortunately, recovery is always rapid, and the donor is usually keen to come again in spite of advice to the contrary.

*Preparation of blood.*—Immediately after collection the bottle of blood is taken to the laboratory where the bleeding set is removed and a sterile screw cap put on. The blood is then put into a refrigerator where it is stored at 4 to 6° C. until required. When bleeding away from the Depot a small cubicle is carried for sterile capping and a refrigerator truck is used to store the blood and transport it to the depot.

At the end of the bleeding of each donor a sample of blood is put into a small test tube strapped to the side of the bottle. This sample is used for the performance of a Kahn test and for re-grouping. No blood is released for distribution until the results of these tests have been reported.

At the time of enrolment the donors are grouped by the simple slide method, using undiluted blood and serum with a titre of not less than 1/64. The re-grouping of the blood after bleeding is done by a dilution method in small test tubes. If this test does not agree with the original one the test is repeated. This great care in grouping is necessary because almost all the blood sent out is "Universal Donor" (Group O), and is given without cross-matching. No error in grouping has yet been detected or even suspected.

*Storage of blood.*—The blood is stored in a large refrigerator where the temperature is carefully controlled at 4 to 6° C. With the addition of glucose the blood can be safely used up to three weeks, but it is not recommended that it should be used after more than two weeks except in an emergency. Experiments have shown that the survival of the transfused cells in the recipient is almost as good with blood stored less than two weeks as with fresh blood. When the demand for blood is fairly

large it is possible to keep a stock of 150 to 200 bottles of group O blood on hand all the time and yet have none of it over a week old.

*Delivery of blood.*—In the early days of the war each hospital was given a stock of blood which was replenished from time to time. This resulted in great wastage of blood and in the use of old blood which had often been stored under far from ideal conditions. Hospitals are now encouraged to keep a stock of plasma or serum for emergency use, and to phone for blood as soon as casualties arrive. This plan has greatly diminished the wastage of blood and has proved very satisfactory. A night and day delivery service is maintained with a fleet of light vans, and blood can be delivered to the majority of the hospitals served within an hour. Arrangements have been made for the distribution of blood to sub-depots if the telephone service is seriously disrupted.

*Supply of transfusion equipment.*—One of the most important services rendered by the Depot is the supply of equipment for giving blood. A very satisfactory giving set has been devised and is distributed with the blood. Each one is sent out in a tin box, sterile, and ready for use.

Many different patterns have been tried, but the present model which incorporates a gas-mantle filter has proved to be far the best. More than 3,000 of these sets have been distributed. After use they are returned to the Depot for cleaning and re-sterilization. The Depot has also supplied bleeding equipment to many hospitals for use if the Depot should be put out of action.

High titre grouping serum is produced for local use and is also available for hospitals. The work involved in the preparation of all this equipment and also the bleeding equipment used in the Depot is very considerable. In an average week there are more than 1,000 needles to be sharpened.

*Plasma.*—The depots began the preparation of plasma early in 1940. It was soon found that it was impossible to produce a uniformly sterile product under the conditions found in the depots and in most hospitals. Attempts were made to filter the plasma without causing clotting. A fairly satisfactory technique has been devised by the Wellecome Laboratories and the Army Blood Transfusion Service, and since that time several thousand bottles of sterile filtered plasma have been prepared and distributed. The plasma is pooled before filtration and the finished product has a negligible agglutinin content. The filtered plasma keeps well at room temperature and has proved very satisfactory in the treatment of shock. Even in cases of pure haemorrhage it gives excellent immediate results until blood can be delivered.

Filtered plasma tends to clot in the cold and the filtration process is tedious and costly. Serum can be handled much more easily, and if the present view that serum is equally satis-

factory in the treatment of shock is confirmed it seems likely that serum will largely replace plasma.

**Dried serum.**—The Medical Research Council Serum Drying Unit at Cambridge has received almost its entire supply of serum for drying from the four London Depots. The output of this plant has been widely used in many hospitals and especially by the services. Dried serum keeps indefinitely and is much more portable than the liquid product. It has proved very valuable in the treatment of shock and especially in burns where it can be given in greater than normal concentration to reduce oedema.

**Mobile resuscitation unit.**—The depots were originally concerned solely with the supply of blood and had no part in the giving of transfusions. However, during the clinical trial of fresh and stored blood (*Lancet*) the depot staffs began to give transfusions, and this side of the work has since been considerably extended. Experience in air raids soon showed that many of the smaller hospitals were in great need of assistance in the resuscitation of badly shocked casualties. The depot now maintains a day and night transfusions service, with never less than one doctor ready to go out and give transfusions and to supervise the resuscitation of cases of shock. In addition, many transfusions are given to ordinary civilian patients. The depots are gradually building up a reputation for careful transfusion technique and are frequently called upon to transfuse specially difficult cases.

#### INVESTIGATION

The tremendous quantities of blood handled by the depots have presented unique opportunities for the investigation of problems related to blood and blood transfusion. Unfortunately the pressure of routine work has made it impossible to take full advantage of these opportunities, but a significant amount of research is being done. Any lull in the bombing of London will result in a very great increase in the time spent in research. Papers have already been published from the depots on transfusion equipment, changes in stored blood, improved methods of blood storage, and the survival of transfused erythrocytes. Investigations are in progress at the Sutton Depot on the venous pressure changes in shock, haemorrhage and following transfusion; on the effect of pooling on the agglutinin-content of plasma; on the survival of transfused erythrocytes following storage in various solutions; and upon the haemoglobin changes in donors after bleeding. It is hoped that this side of depot activity will be expanded in the future. However, the primary duty of the depot is, and always will be, to have an adequate supply of blood, plasma, serum and transfusion equipment immediately available wherever casualties occur.

#### RESULTS

Some idea of the scope of the activities of the depot can be obtained from the following figures which show the work done in September, 1940, a typical month of full activity.

Donors enrolled .....	1,440
Donors called .....	5,060
Donors responded .....	2,606
Bottles of blood obtained .....	2,524
Bottles of blood sent to hospitals .....	904
used for preparation of plasma at Wellcome Laboratories .....	913
used for preparation of serum for drying .....	386
Bottles (540 c.c.) of plasma distributed to hospitals .....	471
Bottles (200 c.c.) of dried serum distri- buted to hospitals .....	214

Air raids may result in a large number of casualties which all arrive at one hospital in a very short space of time. It is not unusual for a hospital to receive 30 to 50 or more casualties within a few minutes. Even the most adequately staffed hospital cannot cope with such a rush and at the same time call up and bleed a large number of blood donors. It is in such emergencies that the depots have proved indispensable. In several cases 30 to 50 bottles of blood and similar amounts of plasma have been delivered to one hospital within a few hours. Calls for 20 bottles of blood at one time are not at all unusual, and have always been filled promptly and without difficulty.

#### FUTURE NEEDS

As long as there is no great increase in the intensity of the attack on London and the Home Counties the London Depots will be able to cope with the demand for blood, plasma, and serum. However, in many areas in England the transfusion arrangements are not nearly so complete and supplies may not always be available if the demand is heavy. This is especially true of plasma and serum. *Canada can help by sending over plasma and serum, preferably dried, for use in those districts not already supplied.*

The London donors have shown a magnificent disregard of personal safety in coming to be bled in spite of air raids. Even in the heavily bombed districts there has been no decline in donor response. Many donors have come to be bled within a few hours after the destruction of their home by a bomb. All Canadians will welcome the opportunity of giving their blood to help the civilian population in England and the men of the Canadian Expeditionary Force.

#### Training of Doctors for Aviation Medicine Needed

Speeding up mass production of aircraft for national defense will be of little use unless a large number of doctors trained for aviation medicine are available.

"All of the major conflicts since the last World War have demonstrated the fact that the air arm is not only the first to be engaged, but that it is likely to be the deciding factor in any struggle. This means that the air arm must be at full strength in men and materials at the beginning of hostilities and remain so until hostilities have ceased.

"While the difficulties of mass production of aircraft are generally known, few persons realize that the mass training of pilots is even a more difficult one.

"The initiation of pilot selection and training must await the organization and training of properly qualified medical personnel. If this vital function is to be properly performed, the necessary number of civil physicians must be selected, organized, and trained before an emergency exists.

"The present-day air force is not, as it formerly was, a small auxiliary arm of the service, but is of major importance and size, and consequently requires a much larger complement of medical personnel than heretofore. For this reason alone, if for no other, a large number of civil physicians should familiarize themselves with the fundamental principles of aviation medicine to the extent that is necessary for our national defense."—H. G. Armstrong, *The Diplomate*, 1940, 12: 247.

#### A New Treatment Highly Suited for Wounds of Modern Warfare

The closed method of treating compound fractures and infected wounds by the application of plaster of Paris casts is particularly suitable under the condition of modern warfare with its numerous civilian casualties from aerial bombardment.

In contrast to the use of chemicals to kill the bacteria, which was employed during the war of 1914-1918, the closed plaster method is based on the principle of rest for the injured part and on the ability of the body to resist bacterial infection. This principle, introduced after the first World War by Baer, of Baltimore, and H. Winnett Orr, Lincoln, Neb., was tested by Orr in the use of the closed plaster method in civilian practice. He obtained good results with the method in from 85 to 90 per cent of compound infected fractures.

"The essential feature of the method is the complete immobilization of the soft tissues. No attempt is made to kill the organisms by external agents. The reliance is placed entirely on the ability of the body to resist bacterial infection.

"The first large scale experiment in the appliance of these principles was made possible in the Spanish war. There, chiefly owing to the enthusiasm of J. J. Trueta, chief surgeon of the General Hospital of Catalonia, the method was adopted in the medical service of the re-

publican army. The total number of cases treated was 20,000. The incidence of gas gangrene and of other infections fell so definitely that foreign surgeons who came to Catalonia at the later stages of the war were led to believe that the soil of Spain contained no anaerobes.

"The method, as described in Trueta's recent monograph, is carried out in the following manner. Surgical treatment is undertaken as soon after occurrence of the fracture as possible; with the patient anesthetized, thoroughly wash the entire extremity and the wound with soap and water and a nail brush, shave all hair and paint the surrounding skin with a weak solution of iodine; excise the skin edges of the wound, remove all contused (bruised) tissue and widen the wound; excise carefully and unhesitatingly all non-viable muscular and cellular tissues; open up the neighbouring cellular surfaces affected by contusion, always keeping in mind the need for adequate drainage; remove all foreign material; reduce the fracture by traction on an orthopaedic table; dress the wound with sterile gauze and immediately immobilize with plaster including the two adjoining joints if possible. The plaster is applied according to the method of Bohler directly to the skin, only the bony prominences being padded; administer 3,000 units of tetanus antitoxin. It is not permissible to cut a window in the cast, since this deprives the soft tissues of much needed immobilization. 'It can be observed,' says Trueta, 'that the tissues swell into the gap in the plaster and their healing power is correspondingly weakened.' This is in essence Orr's treatment, with a single exception, namely that Trueta employs dry gauze as dressing for the wound instead of Orr's petrolatum pack. The plaster is left in position as long as the smell is not excessive and the plaster has not become soft and wet. It may be left in position for from four to six weeks and then replaced and left in position until such time as the fracture has healed.

"In Trueta's own material there were 1,073 cases of compound fractures of the limbs, most of them war wounds. There were 6 fatalities, 976 good or satisfactory results and 91 poor results. Trueta expresses the belief that no other treatment could have enabled them to alleviate for so many victims the horrors of war and air raids. Dr. Rudolph Matas, who had an opportunity to observe the method in the Catalonian war zone, writes: 'I had an opportunity to see several plaster encasements removed from arms and thighs after they had been *in situ* for from fifteen to twenty-one days. The stench of the soiled encasement was nauseating. A magma or mush of decomposing pus and wound secretions covered the surface of the wound under the plaster bandage. But after washing this off with warm water and soap, and when the packs were re-

moved, I was surprised to see the excellent, healthy, pink, well granulated appearance of the wound, coupled with a very satisfactory condition of the patients—no fever, no pain, good appetite. This was indeed a revelation I did not anticipate.' Matas quotes Dr. Jiméno, of Banolas, under whose direction there were treated 6,000 fractures, of which 500 were fractures of the femur, with a mortality for the total group of 3.2 per cent. There was only one case of gas gangrene, and this had appeared before admission to the hospital.

"The rationale of treatment is based on the following considerations: (1) Rest allows local veins and capillary thrombi to form. These prevent and delay the spread of infection and are not broken down by repeated handling. (2) Rest allows new capillaries to form which are not torn down by repeated dressing of the wound. (3) The plaster maintains a constant beneficial pressure on the wound; the calcium in it may be of local value, much as the calcium gluconate exuded by the maggots according to Stewart. (4) The mixture of organisms on the wound may by their mutual antagonism prevent the victory of any one group. (5) To leave a deep wound uncovered produces dehydration and loss of heat leading to a condition of shock. The success of the method depends in a large measure on a thorough understanding of the underlying principles and rigid adherence to a meticulous technique. 'It is fallacious to believe,' warns Trueta, 'that it suffices to enclose a wounded limb in a plaster of Paris cast to achieve the benefits of closed treatment.' He emphasizes that the method should be employed by those qualified by training to plan and undertake the first stages of the technique, which are purely surgical."—*J. Am. M. Ass.*, Editorial, 1940, 115.

#### Remarks on the Orr-Trueta Treatment

The general principles underlying this treatment are.

1. No washing or cleansing other than removal of clothing and gross bits of dirt by forceps. The use of cleansing agents, *i.e.*, soap, gasoline, etc., is contraindicated because it makes the dirt soluble and it may further contaminate the wound. Paint the skin with iodine up to  $\frac{1}{8}$  inch of the edge of the wound.

2. Excise the skin edges  $\frac{1}{8}$  inch only, removing any portions of skin that are so badly damaged that they may not likely recover.

3. Enlarge the wound above and below the wound in the line of length of limb. This must be done adequately because as the missile goes through muscle the cut ends retract and, depending on the number of fibres cut, may retract considerably. It is common for a puncture wound of the calf, to enlarge an original opening  $\frac{1}{4}$  inch to 6 or 10 inches. Then excise all lacerated and damaged muscle and fascia.

Do this with a curved scissors and save much time. The missile can usually easily be located by either direct vision, because adequate incision of the wound should expose the bomb splinter. If any difficulty is experienced then one can use the wireless technique (attaching the aerial of a wireless set to a diathermy needle) and when the bomb splinter is touched, the wireless set gives out interference noises; or leave it alone.

4. Do not tie any vessels (except very large ones like the radial artery, etc.), nor must any catgut be left in the wound. Catgut is dead tissue and must not be left in wounds. There is no need for deep sutures; in fact these are against the whole principle of leaving behind no dead tissue whatever.

5. Close the skin if this can be done without tension, otherwise leave open.

6. Dress with a few pieces of gauze on which is dusted sulfanilamide powder, 5 to 15 grams; then skin-tight plaster with adequate fixation of the joints above and below the wounds, (for calf wounds—from groin to toes).

The results are nothing short of wonderful. The reasons are, I believe, (a) complete removal of dead and damaged tissue does not leave anything for organisms to live on. Virulent *B. Welchii* can be injected with impunity into a normal thigh. (b) Complete rest by plaster (skin-tight is the only plaster that gives absolute rest), gives the natural defenses a much better chance. (c) Plaster fixation prevents nurses and doctors from looking at the wound, disturbing the delicate growing tissues, but prevents them from breathing organisms into the wound. (d) Some other mechanisms are at work and only guessing is possible about their action, *i.e.*, some think that the calcium in the plaster is beneficial. Others talk about antibacterial substances being formed, etc.

I am so converted that nowadays we are treating all fingers damaged in the factories on these principles. The results are so superior to the old ones that they convince one in a very short period, *e.g.*, a badly crushed and shattered finger that many people would consider fit for primary amputation can be dealt with satisfactorily by this method.

Very little plastic surgery is indicated. I have not yet had to graft, although in two cases I did graft to determine in my own mind whether this procedure helped. I am convinced that it did not.

Excision of gas gangrene cases—one excises all muscle that is brick red or does not contract. Perhaps our cases were mild ones, perhaps they were dealt with early, perhaps chemotherapy has altered the outlook. But all five cases have good useful limbs. Twenty tablets M and B 693 is the first dose along with 100,000 units of anti-gas serum; the wound is left widely open and dressed with hydrogen peroxide. In

ten days the wound is so clean that a closed plaster can be applied, although I rather think I stand alone in this opinion. All five cases occurred in patients dealt with by general surgeons; none of the wounds had been adequately excised nor dressed with sulphanilamide powder, nor encased in plaster. One case was a small forearm wound that was so small as to not be considered worth while dealing with.

Not a single case that I have dealt with in the first place has given any trouble, and I long since lost tract of the number I have done. In one case I excised almost all of the hamstrings and when I finished there was an area of skin missing about 10 by 5 inches. This completely healed in a hip spica in eight weeks. One pads a hip spica around the pelvis for comfort, but below the groin, no padding. This case has certainly a very wonderful limb, weak in hamstring power, but developing trick movement with his adductors. The man went back to work three and a half months after his injury, a compound fracture of the femur.

I feel strongly that shortening following fracture cannot be excused. Pin extensions are frequently necessary unless the fracture is transverse, and my routine is—Steinman pin through the crest of the tibia for three weeks; Kirschner wire through the lower end of the femur, three weeks; hip spica six weeks—and no non-union yet!

Another point. Where one has not been able to close the skin I often get the patients walking with a Bohler iron long before the wound has healed. It seems to not interfere at all.

Nowadays, we enclosed the whole plaster when it begins to smell in a black cloth cover (I do not know what this material is but it is an official secret, anyway) and one can often leave the original plaster on until the wound is healed. On removing the plaster one almost has to wear a gas mask.

The treatment of shock is getting more scientific. If the red blood cell count is up give plasma; if down give blood. Morphia, heat cages, raising the foot of the bed, oxygen when cyanosis is present—all these things enable us to get cases to the theatre before the six hours' limit is reached.

My standby for chemotherapy is M and B 693 by mouth; usually 4 tablets to start with; then 2 every 4 hours for 48 hours; then 1 three times a day for two or three days.—(Correspondence from L. W. Plewes, M.A., M.D., F.R.C.S.(Edin.), Orthopaedic Surgeon, Luton, England.)

#### The Schäfer Method of Artificial Respiration

The Royal Life Saving Society recently assembled a number of London medical officers of health and others for a demonstration of the Schäfer method of artificial respiration, a method in which the closest attention to detail may make the difference between resuscitation

and death. The matter is the more important because of the great liability to asphyxiation during air attack; the blast of air created by high-explosive shells on bursting may knock people breathless without actual wounding. Waves of intense smoke from burning buildings, escaping gas from broken pipes, and short-circuiting of electric cables may produce casualties which call for artificial respiration. The principle of the Schäfer operation was described by Mr. George Rew, the society's official lecturer, as the transference of the weight of the trunk of the operator from his heels to his straight arms, his hands being on the small of the patient's back with the patient in the prone position. No other muscular effort was needed. The movements necessary for the complete cycle of expiration and inspiration should occupy five seconds, two seconds being taken up by pressure (for expiration), in which the operator swung slowly forward so that the weight of his body was conveyed to his hands, and three seconds by relaxation (for inspiration), in which the operator swung slowly backward to his first position so that the weight was removed from the hands, which, however, remained in place. Inexpert operators performed the cycle in three seconds instead of five, which was quicker than the normal breathing time of twelve expirations and inspirations to the minute. Another fault was to kneel too far back on the thighs of the patient so that some bending of the arm was necessary, which was likely to tire the operator. The one advantage of the astride method, the lecturer continued, was the central approach, the operator being directly over the patient, but if the operation was long continued in such a position the operator was likely to collapse. Schäfer had experimented with the astride method but had not advocated its general use. From a position at the side of the patient the manœuvre could be carried on for two hours, but in the astride position, owing to the strain on the ligaments of the widely separated thighs, it was impossible to maintain the action for anything like that time. With the side position a relief operator could take over the action from the other side without any waiting or breaking of the cycle.—*Brit. M. J.*, 1940, 2: 234.

#### Burns of the Hands and Face

Last week we reported a meeting of the Royal Society of Medicine at which all speakers agreed that tannic acid should no longer be used as an application for burns of the face, hands or feet. The tanning of the tissues, desirable in the treatment of burns of other parts, causes dangerous compression of the blood-vessels to the fingers and toes, and by stiffening the eyelids may lead to exposure of the cornea. We have received anxious inquiries from A.R.P. workers as to what should be applied to burns on the hands and face. It is understood that

the Navy and R.A.F. propose to issue for the purpose collapsible tubes of a jelly containing 1 per cent of gentian violet and 0.02 per cent merthiolate. There are, however, objections to gentian violet for general use. It is not easily obtainable and it does form a coagulum, though a softer one than tannic acid. In E.M.S. hospitals the application recommended is tulle gras; this consists of curtain net with a 2 m.m. mesh soaked in soft paraffin 98 parts, halibut oil 1 part and balsam of Peru 1 part; it can be kept in tin boxes and applied directly to the burn. Saline packs can be applied outside it and the saline will penetrate the mesh. For first-aid antiseptics should be avoided, and certainly no antiseptic should be used near the eyes. First-aid parties dealing with a burn of the face, hands or feet will be best advised to apply either tulle gras or plain sterile dressings, so that the hospital surgeon will be able to make an unhampered diagnosis when he sees the case for the first time. There is no objection to the use of tannic acid elsewhere on the body. A committee is now considering the first-aid treatment of burns, and is to announce its proposals shortly.—*The Lancet*, 1940, 2: 655.

#### Canadian Hospitality for British Doctors' Children

Sir,—We, as two members of the B.M.A. who on the invitation of friends with relations in Canada sent out small sons to that country early in July, should appreciate the opportunity to express through you our deep appreciation of the kindness of the Canadian Medical Association, which on their arrival made arrangements for their reception, and of the Canadian Government, which has made itself responsible for their welfare while in Canada. Our sons soon after they arrived were transferred to the home of a leading Toronto doctor, where they have received every possible care and kindness, and they are very happy. After a holiday on the Canadian Lakes they were sent to an excellent school. Education in Canada, which is maintained by the Government, is good, and practically free. We had hoped to be able to contribute to their upkeep while in Canada through the Government Evacuation Scheme, whereby British parents could pay according to their means, but learned to our disappointment that this could not be allowed. It has, however, made no difference to the attitude of the children's hosts, who continue to display a generosity almost unbelievable to anyone who does not know Canadian people.

Our purpose in writing this letter is, first, to express our gratitude to the Canadian doctors and their Government; secondly, because, although it has been published, the opportunity afforded by the Canadian Medical Association seems little known to British doctors, and it

has occurred to us that there may be medical parents in this country whose circumstances are more difficult than our own and who would be glad to avail themselves of the offer of their Canadian colleagues. We are assured in correspondence that many Canadian doctors would be glad to receive the children of British doctors into their homes.—We are, etc.,

H. B. PADWICK.  
G. A. METCALFE.

Bedford, Nov. 3.

(From *Brit. M. J.*, 1940, 2: 687.)

#### Letter from Dr. Alfred Cox

Those of us who have had the privilege of meeting Dr. Cox will be interested in the following letter which he has addressed to our General Secretary. We, in Canada, wish to echo his kindly greetings.

Henley on Thames.

*My dear Routley:*

War or no war, I cannot let Christmas pass without sending a word of greeting to you and yours. As one gets older one lives more and more in the past, and amongst my most precious memories are my visits to Canada and my contacts with you and your wife.

You will see I have left London. My work finished at the end of September, and as I could find nobody who wanted the services of an old man I concluded that the best service I could render London at such a time was to get out of it. Two days after I left my old home was badly damaged by a blast from a bomb which struck houses opposite. A week later two incendiaries tore out a good deal of the top floor on which were most of my small possessions, and exactly a week after that four more incendiaries made even the two lower floors uninhabitable. Fortunately, the lady with whom I live had, with considerable foresight, taken this tiny cottage and I came here and she comes down every night, still carrying on in a small flat close by her business of teaching languages.

Here it is comparatively quiet. We get warnings and occasionally a bomb (none nearer than half a mile, so far) and the Boche planes come over every night on their way to the Midlands. I am well and fit, but still unreconciled to idleness. It is not easy (as you will find in time) to believe that after such a crowded life nobody seems to need you. But I suppose it must come to all of us sooner or later. I wish it could have been postponed in my case until the war was over.

We have all got our teeth set and feel certain that in time we shall come out on top; but it may be a long time yet. It is a tremendous comfort to us to know that Canada and all the other Dominions are solidly at our back and I do hope Canada, at the end of it all, will do its share in insisting that these brutes who are trying to

destroy all our conceptions of common decency are treated rough. My ideal is a nice little island for Hitler & Co., run on the most approved German concentration camp lines, and manned entirely by Jews who have been expelled from Germany! How they would enjoy the job!

This is a queer kind of Christmas letter, but it must serve, and anyhow you will believe me when I say I send my most affectionate greetings to you and your family and to any Canadian friends who remember me.

Yours very sincerely,  
November 24, 1940. (Signed) ALFRED COX

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- Infection in the Shelter (leading article), 1940, 2: 455.
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- War-time Psychiatry and Economy in Man-power, D. Curran and W. P. Mallinson, 1940, 2: 738.

#### BOOKS AND PAMPHLETS

- Injuries of the Jaws and Face, with Special Reference to War Casualties, W. Warwick James and B. W. Fielding, John Bale and Staples, London, 1940, price 15s. (rev. in *Brit. M. J.*, 1940, 2: 715).
- Official History of the Australian Army Medical Service, Vol. 2. (Obtainable from the Australian Trade Commission, 15 King St. W., Toronto, price 21s.)
- Surgery of Modern Warfare (H. Bailey, Editor), E. & S. Livingstone, Edinburgh, 1940, price 12/6.

It is said, and we think, with much truth, that the British are able to extract a fund of humour out of the most unlikely situations. The placards posted in Britain and the cartoons printed in the English-speaking countries relative to the War are sufficient evidence of this. Even the advertisements at times manifest the same tendency. The following is good, and would be still better were we able to reproduce the illustrations with which it is garnished. It, apparently, is the effort of some milk company.

"I do not mind the black-out,  
I do not mind the war,  
I don't mind Goebbels lying,  
For what is Goebbels for?"

I don't mind Hitler hitting,  
I don't mind Goering's fat,  
The only fat in Germany—  
We cannot grudge them that!"

I do not care how Himmler  
His Nazi friends may bilk;  
I have no nerves in wartime;  
It isn't luck . . . it's  
MILK."

### Medical Societies

#### Société médicale des hôpitaux universitaires de Québec

Une séance de la Société eut lieu à l'Hotel-Dieu de Québec le 6 décembre 1940. Suivent les résumés des travaux.

**AMYGDALITE ET APPENDICITE.**—Charles Vézina et Pierre Jobin.

Se basant sur les relations cliniques et histologiques qui unissent l'amygdale à l'appendice les auteurs citent quelques exemples parmi tant d'autres d'observation courante pour mettre en lumière l'équilibre qui existe entre ces deux foyers de tissu lymphoïde dans le plan de la défense anti-infectieuse.

Ces deux organes peuvent devenir à leur tour des centres d'infection dont il faut débarrasser l'organisme. Pour éviter le déséquilibre, ils conseillent de supprimer l'amygdale et l'appendice à quelques jours d'intervalle, en commençant par l'amygdale.

Ils insistent sur le fait que le médecin doit surveiller de très près un point appendiculaire douloureux qui apparaît au cours d'une amygdalite aiguë et ils disent toute l'importance qu'ils attribuent au symptôme défense musculaire, seul symptôme capable de tracer une ligne de conduite adéquate dans l'appendicite aiguë.

**LA COLITE ULCÉREUSE D'ÉTILOGIE INCONNUE.**—J. B. Jobin et J. P. Dugal.

Malgré de multiples recherches, l'étiologie et la pathogénie de la colite ulcéreuse sont encore inconnues. L'affection ne semble pas relever des microbes dysentériques; la rareté relative de la dysentérie bacillaire dans notre région comparée au nombre élevé de colites ulcéreuses, et l'apparition de la maladie chez des individus antérieurement sains à une époque de l'année où nous ne voyons pratiquement jamais de dysentérie, sont des arguments de valeur. Chez nos malades nous n'avons jamais isolé de germes dysentériques. La théorie de l'agent spécifique est abandonnée. La question du terrain est peut-être d'importance capitale; terrain spécial où le

déséquilibre nerveux local ou général et l'anaphylaxie jouent les principaux rôles.

L'évolution de la maladie est caractéristique: périodes de dysentérie avec phases de sédation. Durant ces périodes d'accalmie, la guérison est clinique mais non anatomique puisque dans la plupart des cas il persiste des lésions décelables à l'endoscopie. Le médicament actif est encore recherché. L'évolution spéciale de la maladie rend difficile l'appréciation de la valeur des thérapeutiques. Une diète appropriée, des lavements et des pansements locaux, rendent de grands services. Les sulfamidés et l'emploi de la vitamine "A" localement comme stimulant de la régénération cellulaire nous ont donné des résultats appréciables.

#### RÉACTIONS BIOTROPIQUES AU COURS DU TRAITEMENT DE LA SYPHILIS PAR LES ARSÉNICAUX.—E. Gaumond (Travail du Service de Dermatologie: Prof. R. Mayrand).

Le biotropisme est le nom donné par Milian à certains phénomènes constatables cliniquement, apparaissant au cours du traitement d'une maladie quelconque par un médicament ou un agent thérapeutique quelconque. Les produits chimiques, d'après lui, ont deux propriétés: l'une nécrotope qui aboutit à la mort de l'élément, l'autre biotope qui exalte la fonction vitale de cet élément. La réaction biotropique est directe quand l'exaltation de virulence s'adresse au germe de la maladie traitée; elle est indirecte quand l'exaltation de virulence s'adresse à un micro-organisme latent.

Cinq observations de malades sont rapportées. Il s'agit de syphilitiques hospitalisés à l'Hôtel-Dieu. La première observation a trait à une réaction biotropique directe ou réaction de Herxheimer; les suivantes à des réactions indirectes avec apparition au 9ème jour d'erythèmes morbilliformes et symptômes généraux simulant la rougeole.

On peut discuter de l'interprétation à donner à ces réactions qui constituent, tout de même, des faits cliniques indiscutables. Elles ne doivent pas être considérées comme des accidents thérapeutiques et ne contre-indiquent nullement la continuation du traitement.

#### LA ROENTGENTHERAPIE POST-OPÉRATOIRE DANS LES CANCERS DU SEIN.—Léo-R. Payeur.

Dans la statistique présentée l'auteur s'est borné à rapporter les résultats obtenus par la chirurgie et la roentgentherapie post-opératoire. Tous les cas rapportés sont du type II de la classification de Stendhall. Il décrit sommairement les techniques chirurgicales et les techniques roentgenothérapeutiques qui ont été employées dans la cure de ces cancers du sein.

La statistique comporte 119 cas du type II de la classification de Stendhall, dont 10 n'ont pu être retracés. Après 3 ans la chirurgie seule compte 42.9 pro cent de succès; la chirurgie suivie de roentgentherapie 66 pro cent.

#### DEUX CAS DE DOLICHO-MEGA-SIGMOIDES.—Charles Vézina.

Ces deux observations rapportées concernent deux malades, de 31 ans et de 37 ans, qui furent opérés, l'un au cours d'une obstruction intestinale, et l'autre qui ne présentait aucune complication. Le premier eut une colectomie en deux temps.

Le traitement du dolichosigmoïde doit être médical, aussi longtemps que possible. Si les troubles continuent après un essai prolongé du traitement médical: grands lavements à l'eau chaude, laxatifs huileux et mucilagineux et régime, il faut faire une colectomie qu'on peut réaliser en un temps.

S'il y a complication, obstruction, volvulus, il faut opérer. Mais ici la prudence nous conseille de faire l'opération en deux temps; autrement, en voulant rétablir immédiatement la continuité du colon, après résection, on s'expose à ce que les sutures lâchent parce qu'elles ont été faites sur une paroi intestinale œdématisée et inflammée. Il pourra s'ensuivre alors une péri-

tonite mortelle. Quant à la colopexie, elle n'est pas à conseiller, car elle donne bien peu de résultats.

Séance à la Faculté de Médecine, le 18 décembre 1940.

#### L'ANGINE DE POITRINE EN CLINIQUE.—Richard Lessard.

Dans ce travail, seul l'aspect clinique de la question est envisagé. Le syndrome angineux, d'abord défini, est ensuite étudié dans ses manifestations fonctionnelles les plus usuelles. Les formes cliniques sont ensuite passées en revue en insistant sur celles qui découlent des circonstances d'apparition du syndrome: angine d'effort, expression d'une aortite ou d'une coronarite; angine de décubitus, tributaire de l'insuffisance ventriculaire gauche.

L'examen clinique, radiologique et électro-cardiographique du malade est ensuite exposé avec quelques détails, en ne manquant pas de souligner que dans un certain nombre de cas, il peut demeurer essentiellement négatif.

Les théories pathogéniques qui tentent d'expliquer le syndrome sont ensuite discutées. Et les facteurs étiologiques nombreux et divers sont tour à tour étudiés et classifiés selon leur importance relative.

Les diagnostics différentiel et étiologique sont alors formulés. Et l'on aborde le problème du pronostic qui doit être résolu avec prudence et discréption. Lorsque l'on veut trop préciser en ce domaine, on s'expose à ne recueillir, à côté de triomphes éphémères, que de fréquents désenchantements.

Un bref rappel de ce que doit être l'examen complet d'un angineux et le travail se termine en soulignant l'importante contribution des travaux chirurgicaux contemporains dans le traitement des coronarites.

#### REVUE D'ENSEMBLE DU TRAITEMENT MÉDICAL DE POITRINE.—Renaud Lemieux et Guy Drouin.

*Traitements de la crise.*—Au cours de la crise d'angor cardio-artériel (tant de la forme commune que de celle de l'angor abdominalis) et d'angor cardiaque, lorsque le seul repos est inefficace, il faut employer un médicament; on fera successivement appel à la dragee de trinitrine caféinée, à l'inhalation de nitrite d'amyle et à l'injection sous-cutanée de morphine; des auteurs français se sont servis avec succès des injections locales intradermiques d'acides aminés (solution mixte d'histidine à 4 pro cent et de tryptophane à 2 pro cent). En cas de signes d'insuffisance cardiaque, pratiquer une saignée prudente suivie de l'injection de  $\frac{1}{8}$  mgm. de ouabaine et d'une injection de morphine. Le traitement de la crise d'angor aigu coronarien fébrile (infarctus du myocarde) vise trois indications: calmer rapidement la douleur par des injections répétées de morphine, à hautes doses, soutenir le cœur défaillant par des injections répétées de camphre et tenter de diminuer l'ischémie cardiaque par une médication vaso-dilatatrice. Aux Etats-Unis, on vante les bons effets de l'oxygénotherapie. Les crises d'angor non-organique (réflexe, névrosique, toxique) cèdent généralement à l'emploi de petits moyens, ou au plus de la trinitrine caféinée; dans ces cas ménager la morphine.

*Traitements de l'intervalle des crises.*—Le traitement de l'intervalle des crises d'angor cardio-artériel se résume 1°—dans des prescriptions hygiéno-diététiques (vie calme, régulière, alimentation de digestion facile); 2°—médicamenteuses (vaso-dilatateurs: nitrite de soude en injections, théobromine, benzoate de benzyle, acétyl-choline, dérivés xanthiques; sédatifs: gardénal, bromure de sodium, teinture de passiflore) dont l'une mérite une mention spéciale, le prosympal ou 883 F: il donne les meilleurs résultats dans les syndromes où les abcès sont le phénomène dominant en l'absence de toute manifestation clinique, radiologique ou électrocardiographique de défaillance cardiaque, de coronarite ou d'aortite; les injections intra-dermiques d'acides aminés se seraient montrées inefficaces pour certains auteurs français: Lian

emploie des injections sous-cutanées d'acide carbonique; la thérapeutique étiologique consiste dans la médication iodée intensive et le traitement anti-syphilitique que l'on est souvent en droit de tenter à titre d'épreuve; 3°—dans des prescriptions physiothérapeutiques (diathermie, radiothérapie).

A la suite d'une crise d'infarctus du myocarde il faut chercher à favoriser la cicatrisation en diminuant au maximum le travail du cœur et éviter les accidents menaçants comme l'asystolie, la rupture du cœur et les arythmies graves.

Entre les crises d'angor cardiaque on traite la cardiopathie en cause. Dans les angors reflexes le traitement est celui de l'aérogastrie, de la lithiasis biliaire, ou des névralgies. Contre les angors névrosiques, prescrire des cures alternées de gardénal ou de bromure. Le retour des crises d'angor toxique sera empêché par la suppression des facteurs en cause.

## University Notes

### University of Toronto

Dr. Robert D. Defries has been appointed Director of the School of Hygiene and of the Connaught Laboratories, University of Toronto. During the past twenty-five years he has been prominent in the work of these two institutes, having early in 1915 become actively associated with the late Dr. J. G. FitzGerald, whom he now succeeds.

## Letters, Notes and Queries

### Athlete's Foot

#### To the Editor:

Replying to your letter of January 2nd, in which you mention an inquiry from Dr. Henry Moyse, of Bedeque, P.E.I., in reference to suggestions for the treatment of obstinate cases of athlete's foot, I would say:—

I am of the opinion that the following treatment, if conscientiously kept up, is by far the most satisfactory.

(1) A 2 grain tablet of potassium permanganate is dissolved in one quart of warm water. If the tablets are not locally procurable a pinch of the crystals, only sufficient to make a deep claret coloured solution will suffice. Get the patient to soak his feet for one hour night and morning. After the soaking expose them to the air for ten or fifteen minutes, sunlight if possible, for oxidation, then apply the following ointment.

(2) R Ac. Benzoici      |    aa. grs. xv  
                        Ac. Salicyl.      |  
                        Petrolat. Alb.      ad. 5 i

If the patients could get themselves several pairs of cheap white cotton socks, so that they would have a pair boiled each day and clean for

Answers to letters appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

the next application of the ointment, to wear under their ordinary socks, it would make the treatment less messy and more comfortable.

I think the most important thing to impress upon the unfortunates is to keep up their treatments for several weeks after they consider themselves cured.

PHILIP BURNETT

Montreal, January 6, 1941.

## Abstracts from Current Literature

### Surgery

**Partial Gastrectomy for Duodenal Ulcer; a Report of 212 Cases.** "Gastrectomie partielle dans l'ulcère duodénal; rapport basé sur 212 cas." Lewis, E. B. et Lemon, R. G.: *Proc. Staff Meet. Mayo Clinic*, 1940, 15: 765.

Depuis plusieurs années, en Europe centrale, la gastrectomie partielle est pratiquée quasi systématiquement dans l'ulcère duodénal réfractaire au traitement médical. En Amérique du Nord, cette mesure n'est adoptée que depuis une dizaine d'années. Les auteurs jugent donc opportun de considérer d'ores et déjà les résultats obtenus à la Clinique Mayo, jusqu'à ce jour, par la gastrectomie partielle, (excision d'au moins un tiers de l'estomac) procédé de Polya, exclusivement dans les ulcères duodénals n'ayant pas subi antérieurement de gastro-entérostomie ni de gastrectomie partielle.

Trois buts sont visés dans le traitement de l'ulcère duodénal—1° la suppression du spasme pylorique; 2° la diminution de la concentration de l'acide dans le contenu gastrique; 3° la diminution dans la durée de l'évacuation gastrique.

Le Polya atteint ces buts mieux que toute autre opération. La gastrectomie partielle, mieux que la gastro-entérostomie, diminue l'acidité gastrique chez un plus grand nombre d'opérés. La gastrectomie cependant ne doit pas comporter un risque disproportionné à celui de la gastro-entérostomie. On doit donc considérer chaque cas en particulier, pour la nature de l'opération à pratiquer. Les 212 cas, base de ce travail, concernent: 144 cas d'ulcère duodénal opérés pour la première fois. 25 cas d'ulcère duodénal perforés et suturés antérieurement dans d'autres hôpitaux. 43 cas d'ulcère gastriques coexistant avec un ulcère duodénal. Sur 212 gastrectomisés, 4 morts, c'est-à-dire 1.9 pro cent. 197 de ces patients c'est-à-dire 95 pro cent, ont pu être suivis après leur départ.

Sur 134 gastrectomisés pour ulcère duodénal, revus et suivis, 81 pro cent menèrent une vie normale sans restriction diététique; par contre 16 pro cent durent restreindre leur diète et leur activité coutumière sans toutefois présen-

ter de signes d'ulcus peptique ni de signes d'ulcère duodénal récidivé. 3 pro cent eurent des symptômes d'ulcus peptique.

#### DISCUSSION

Waltman Walters: commente le travail des auteurs et fait remarquer notamment que les cas d'ulcère duodénal rapportés sont ceux qui présentèrent des hémorragies duodénales et ceux de malades de 30 à 60 ans environ avec acidité concentrée. Dans les ulcères petits, et chez les malades fragiles, la gastroentérostomie fut pratiquée. Walters en 1936 fit remarquer que 60 pro cent des gastrectomisés (type Polya) pour ulcère duodénal revinrent à une acidité quasi normale. Si les résultats obtenus par Lewis quant à l'acidité gastrique post-opératoire sont meilleurs (72 pro cent) cela est dû, semble-t-il à ce que l'estomac fut réséqué sur une plus grande étendue.

Si l'ulcère récidiva dans 2.5 pro cent des cas, d'autre part 14 pro cent présentèrent des signes rappelant ceux de la gastrite et de l'irritation persistante du vague, signes caractérisés par une tendance aux hypothyries et aux transpirations immédiatement post-prandiales soulagées par le décubitus dorsal. Ces signes ne se manifestent que rarement après les gastro-entérostomies.

De ces 134 cas sont exclus les 25 cas d'ulcère duodénal ou gastriques associés. Sur les 25 cas, d'ulcère duodénal perforés et suturés, 84 pro cent, restèrent bien portants, 12 pro cent furent soumis au régime et au repos relatif et un opéré eut des signes d'ulcère récidivé. Les meilleurs résultats de la gastrectomie furent dans les cas d'ulcère duodénal et d'ulcère gastrique associés. Sur 38 patients suivis, 92 pro cent, devinrent bien portants, 8 pro cent durent suivre un régime mais aucun ne présente d'ulcère récidivant.

PIERRE SMITH

**Malignant Tumours of Hernial Sacs.** Zimmerman, L. M. and Lanfman, H.: *Arch. Surg.*, 1940, **41**: 1215.

Primary malignant tumours of the tissues of hernial sacs are extremely infrequent.

The authors report three instances in one of which complete data were presented, including post-mortem observations. In the other two patients, while a diagnosis of malignant mesodermal tumour of the excised sac tissues was made, the data are somewhat equivocal. One of the patients is still alive and free from recurrence, and in the case of the other permission for autopsy could not be obtained. In each instance the growth was a sarcoma. All the patients were operated on with a diagnosis of incarcerated hernia, and the presence of a malignant neoplasm was not suspected until histological study was made of the excised sac tissues.

G. E. LEARMONT

#### Obstetrics and Gynaecology

##### Leucorrhœa in Pregnancy: A Study of 200 Cases.

Liston, W. G. and Cruickshank, L.

G.: *J. Obst. & Gyn. of the Brit. Emp.*, 1940, **47**: 109.

1. Among 200 pregnant women who were supposed to be suffering from leucorrhœa, 40, or 20 per cent, showed normal vaginal contents characterized by the findings that pus cells were less numerous than epithelial cells, that the bacterial flora consisted wholly of Döderlein's bacilli, that the pH of the vaginal contents lay between 4 and 5, that glycogen was abundantly present in the epithelial cells.

2. Cervical lesions, including erosions, were present in 79 of the 200 patients, i.e., in nearly 40 per cent. More than half of these cases were complicated by other causes of leucorrhœa. There were, however, 31 patients in whom the condition of the cervix was the possible explanation of the leucorrhœa. The degree of departure from the normal characteristics of the vaginal contents in these cases depended to some extent on the severity of the cervical lesions, but this was not always the case. The more severe forms of cervical lesions were associated with abnormal features of the vaginal contents, for pus cells became more numerous, the bacterial flora tended to drift towards Types II and III, the hydrogen-ion value became higher, i.e., less acid, and glycogen less abundantly present in the epithelial cells.

3. Gonorrhœa accounted for only 4 cases among the 200 pregnant women suffering from leucorrhœa.

4. The parasite of vaginal thrush was found to be the cause of the leucorrhœa in 49 cases, i.e., in approximately 25 per cent. This infection is easily overlooked unless films are made from the white patches characteristic of the disease. The condition should be diagnosed by finding the hyphal filaments of the fungus. The blastospores of this fungus may be confused with yeast cells.

5. *Trichomonas vaginalis* is by far the commonest cause of leucorrhœa in pregnant women. Seventy-five cases of this infection were met with among the 200 women examined, or, in round numbers, 40 per cent of the whole. In all these cases pus cells preponderated over epithelial cells in the vaginal films, and the majority of the cases presented a bacterial flora of Type III. The pH of the vaginal contents lay generally between 5 and 6, the more acute cases nearer 6, the more chronic cases nearer 5. Recovery was associated with a return of the pH of the vaginal contents to between 4 and 5, and this was associated with a change in type of the bacterial flora from III to I through Type II. Glycogen was generally deficient in the epithelial

cells. The condition was in some cases complicated by cervicitis or the presence of the thrush fungus or the gonococcus. P. J. KEARNS

### Dysmenorrhœa and Sterility Personality

**Studies.** Wittkower, E. and Wilson, A. T. M.: *Brit. M. J.*, 1940, 2: 586.

Fifty-seven unselected patients with primary dysmenorrhœa, 30 unselected patients complaining of sterility, and 30 primigravidæ who had never suffered from dysmenorrhœa were submitted to a biographical study covering childhood characteristics, reactions to adolescence, and adult personality.

Comparing the three groups as children, psychologically well-adjusted groups were found in great excess in the control group, and only two of this type were noted in the sterility and dysmenorrhœa patients. As children the dysmenorrhœa group showed psychological maladjustment four times as often as the control group. Of these maladjusted types the sterile group contained a high excess of ailing, timid, unsociable children, devoid of self-assertion, while the dysmenorrhœa group contained an excess of children who were boisterous and manifestly aggressive—obstinate, bad-tempered or headstrong. As adults the dysmenorrhœa patients showed a high excess of two main personality groups—the first characterized by deep resentment of their feminine rôle; the second obviously immature physically, and either shy and shut-in or chronically anxious and complaining. A vast majority of the sterile adult patients display an unusual self-centredness in their social and personal relations, clearly seen in a sexual frigidity with abnormal reactions to coitus.

ROSS MITCHELL

**Endometriosis of the Lungs.** Hobbs, J. E. and Bortnick, A. R.: *Am. J. Obst. & Gyn.*, 1940, 40: 832.

Endometrial tissue can be transported through veins. Endometrium of the rabbit can be transported through the veins to the lungs where it will remain viable and invade the parenchyma. Implants of uterine and horn mucosa in the lungs may undergo decidual formation if the animal becomes pregnant. An oestrogenic hormone (stilboestrol) in relatively large doses apparently stimulates the endometrial tissue implanted in the lungs. Excessively large doses may inhibit the growth of this tissue.

Clinical evidence correlated with experimental work leads us to the following deductions. Vicarious menstruation is the result of an endometrial implant in whatever region from which the periodic bloody discharge issues. Certain benign and malignant tumours in the lungs of women may arise from endometrial transplants. Pulmonary endometrial implants may be mistaken for tuberculosis.

ROSS MITCHELL

### Therapeutics

**Common Winter Disorders of the Nose and Throat Among the Services Under War Conditions.** Shea, H. V.: *Practitioner*, 1940, 145: 316.

The sulfonamide drugs have revolutionized the treatment of various infections of the nose and throat. When these drugs are given the dosage must be adequate to secure early concentration, and even after the temperature has fallen, a watch for complications must still be kept.

*Acute rhinitis (coryza)* has a greater incidence in war time when large bodies of men are living in environments which encourage the development of disease. The prophylactic phase of treatment is even more difficult than in normal times. Where billets in private houses are available for individuals these should be found, thus relieving congestion and securing proper conditions for sleep. Clothing should be of suitable weight, sanitary arrangements regularly inspected, and the diet sufficient. Therapeutic treatment consists of mild purgatives, rest in bed and either Dover's powder or aspirin. M. & B. 693 given in early stages will cut short the attack. Ephedrine followed by a menthol and camphor oily spray to the nose is helpful.

*Acute sinusitis* is a more frequent complication of influenza than an ordinary "cold in the head". In frontal sinusitis the pain begins in the early forenoon, gradually gets worse until it reaches the climax about mid-day, after which it gradually lessens. In maxillary sinusitis the sense of smell is impaired. Local pain, some fever, and, possibly, chills are observed. Methods of special examination are used to confirm the diagnosis. The treatment consists of promotion of drainage, by sprays and inhalations if possible, and by operation and irrigation if necessary.

*Acute pharyngitis* starts with a chilly feeling, headache, and pains in the back and limbs. The throat is raw and somewhat painful. The posterior pharyngeal wall, soft palate and fauces are reddened and possibly oedematous. If seen early the patient should have a hot bath and be put to bed, and should be given aspirin or tinct. opii. Local treatment consists of painting the throat with 10 per cent silver nitrate. A spray or gargle has a soothing effect.

*Acute tonsillitis* has three varieties: (1) catarrhal or parenchymatous; (2) follicular; and (3) peritonsillar abscess. For all types rest in bed and antipyretics are indicated. The sulfonamides have been found to give good results. As in some cases acute tonsillitis may be a manifestation of rheumatism, sodium salicylate should be given until convalescence sets in. When a peritonsillar abscess forms it should be opened.

*Vincent's angina* is frequently met with among soldiers in war time. The ulcers should

be painted with a solution of tinct. ipecac., glycerine and liq. arsenicalis. Other local applications, including salvarsan, 10 per cent, are recommended.

*Diphtheria* must be differentiated from other infective conditions of the throat by examination of a smear.

*Simple acute laryngitis* may occur during an attack of acute coryza or influenza. When laryngitis results from inhaling mustard gas a fibrinous deposit is found on the anterior part of the vocal cords (chorditis fibrinosa). In mild cases it is sufficient to keep the patient indoors and forbid use of the voice and smoking. When symptoms are more marked it will be necessary to confine the patient to bed on a light diet. Laxatives and diaphoretic mixtures may be prescribed.

C. R. BOURNE

#### Modern Therapeutics; Cholagogues and Drugs

**Acting on the Liver.** Newman, C.: *Practitioner*, 1940, 145: 361.

Renewed interest in drugs acting on the liver has led to three new principles.

1. There has been a separation of the "cholagogues" into two groups, first, the "chloretics" which cause an increased secretion of bile by the liver, and, second, the "pure cholagogues" which empty the gall bladder and so cause an increase in bile-flow into the intestine without necessarily increasing the amount secreted.

2. In gall-stone formation it is not so much an increase of cholesterol in the blood which does harm as a decrease in the bile-salt content. The bile salts keep the cholesterol in solution, and as long as this is kept in solution it can cause no trouble.

3. "Biliary stasis" is rarely the result of weakness to be treated with stimulants of gall-bladder contraction, but is usually caused by reflex spasm preventing the outflow of bile, and is properly treated by sedatives.

Of the chloretics the bile acids are most efficient. The choice may be made from taurocholic, glycocholic, desoxycholic and dehydrocholic acids. The latter should be used where chloresis without increased absorption of cholesterol is required. Potassium salts are chloretics; increased water intake does not promote secretion of bile, but a high protein diet does.

Pure cholagogue action is secured in normal subjects by magnesium sulphate, fats, eggs, vegetable oils and vagal stimulant drugs.

To eliminate reflex spasm of the gall bladder the best sedative is tincture of belladonna. The suitable dose varies from individual to individual, and there are atropine-sensitive patients in whom grave results occur. A technique is described for determining the correct dosage. It is usually best to give alkali along with the belladonna.

In the treatment of cases of parenchymatous liver damage there are three remedies of known value, yet with little or no scientific proof. At

the head of this list is glucose, best administered in the form of a sweetening for fruit drinks. Next comes calcium. Orally it may be given as calcium sodium lactate, while calcium gluconate or laevulinic acid may be given intravenously if care is taken. The third remedy is sodium bicarbonate. There is no need to make the urine alkaline; 10 grains three times a day is enough.

C. R. BOURNE

#### Oto-rhino-laryngology

**Nasal Osteomata.** Handousa, A. S.: *J. Laryngol. & Otol.*, 1940, 55: 197.

In 840,000 ear, nose and throat patients during seven years at Cairo, Egypt, 37 benign tumours were seen. Of these 18 were osteomata. The eighteen case reports are presented in detail. None had either tuberculosis or syphilis. All had a negative Wassermann test. None had any similar tumour elsewhere. All showed normal fundi and had negative central nervous systems. Nine cases were symptomless; 5 had pressure symptoms with gradually increasing exophthalmos; and 4 had simple swelling. Males were more commonly affected than females. The symptoms appeared between twelve and fifty-four years. None became malignant. Thirteen of the tumours were attached to the frontal bone. All arose in the immediate neighbourhood of an epiphyseal line. The complications and location seen suggest that the tumours arose from a sequestered "rest" of the epiphysis of the affected bone.

Differential diagnosis is simple, being made by the characteristic feel of the tumour and the x-ray picture. Treatment is by surgical removal, and is only necessary when symptoms or complications are produced. Extra-nasal exploration is best. Drainage is provided if necessary. Symptomless tumours are not touched.

G. H. FISK

#### The Treatment of Acute and Chronic Sinusitis.

Brown, J. M.: *J. Am. M. Ass.*, 1940, 115: 508.

A careful general investigation of the patient's physical condition is an essential preliminary in all types of sinusitis, for it may disclose important underlying etiological factors which may make local treatment or surgery unnecessary. Surgical treatment should be avoided, if at all possible, during the acute stage. Conservation of the nasal mucosa is imperative in all sinus surgery. Early recognition of serious complications, with appropriate treatment, is stressed. The greatest single essential of treatment in both acute and chronic sinusitis is adequate drainage.

C. C. MACKLIN

#### Radiology and Physiotherapy

**Prognosis in Silicosis.** Farrell, J. T., Jr., Sokoloff, M. J. and Charr, R.: *Am. J. Roentgenol. & Radium Therapy*, 1940, 44: 709.

In a study of 511 anthracite coal miners with silicosis it was found that only 77 were dis-

charged as improved, while 243 were unimproved, and 191 died.

The ages of those who improved and those who died varied from 15 to 69 years, with the majority in the fourth, fifth and sixth decades. Most of the deaths occurred in the fifth and sixth decades in those who had worked from eighteen to twenty-three years.

Emphysema is the most common complication, and, when extensive, the prognosis is unfavourable. The second most common complication is tuberculosis. The prognosis in the first and second stages of silicosis complicated by tuberculosis is the same as in non-silicotic tuberculosis, but in Stage III the prognosis is made much worse. Patients with clinical tuberculosis but with negative sputum have a better prognosis than those with clinical tuberculosis and positive sputum.

The roentgenological changes most suggestive of tuberculosis are asymmetrical consolidation and cavitation, regardless of the findings in the sputum.

Spontaneous pneumothorax occurs more frequently in silicosis complicated or uncomplicated by tuberculosis than in any other pulmonary disease; it was present in 22 instances in the total series. It may be bilateral and affects the prognosis unfavourably.

R. C. BURR

#### Treatment of Cancer of the Lip and Mouth.

Pfahler, G. E.: *Radiol.*, 1940, 35: 598.

Cancer of the lip can be prevented in practically all cases by treating skilfully the lesions that frequently precede cancer. By making an effort to treat such lesions many early cancers will also be reached and cured.

Cancer of the mouth can be prevented by treating any leukoplakia as soon as it develops, destroying any papilloma, treating any lesion of the mucous membrane, such as erosion, ulcer, irritation, or induration. Electro-desiccation is valuable in these precancerous conditions. The treatment of cancer of the lip and mouth must include both the local or primary lesion and the regional lymphatics. Irradiation is the preferable treatment for cancer of the lip and mouth.

R. C. BURR

#### Blocking of the Ureters in Intravenous Pyelography by Means of Filling the Bladder with Oil.

Arendt, J. and Maslow, L. A.: *Radiol.*, 1940, 35: 352.

By filling the bladder with from 150 to 250 c.c. of mineral oil we are able to prevent the intravenous dye from reaching the bladder, thus keeping it back in the ureters and pelvis without further need of any outside compression. We thus have: more complete filling of pelvis and calices; less spastic and reflex contractions of pelvis and ureters than with other methods; a clear outline of the lower pelvic portion of the ureters, which is usually obscured by the presence of dye in the bladder. The procedure is

simple and harmless when contraindications are observed.

R. C. BURR

#### Pathology and Experimental Medicine

##### Capillary Fragility: Critical Analysis.

Bell, G. H., Lazarus, S. and Munro, H. N.: *The Lancet*, 1940, 2: 155.

The authors sought to determine the variations in the capillary fragility by Gothlin's method among 346 healthy British students, to define the range of normality, and to determine the effect of ingested vitamin C on those students considered to have an increased capillary fragility. The number of small cutaneous haemorrhages occurring under standard conditions was taken as an index of the capillary fragility or resistance. Variations in the illumination altered the mean number of petechiae detected.

Among 89.3 per cent of the students less than 8 petechiae were found. The ingestion of vitamin C by the 35 students who had a petechial count of 8 or more reduced the count to less than 8 in two weeks. The ingestion of vitamin C had no effect on those students with less than 8 petechiae in the count. There were 5 healthy persons among the 346 whose increased capillary fragility was not influenced by the administration of either vitamin C or P.

Apart from abnormal influences, for example fever and the administration of heavy metals, two factors influence capillary fragility in health, menstruation and ascorbic acid. Other factors may be involved, but these at present are not understood, as in those students who did not respond to treatment. Variations in the values found at various sites make it difficult to assess the results, but an average of the petechial counts on the two arms of the individual appear to give a more accurate indication of the true capillary fragility.

S. R. TOWNSEND

##### Congenital Pyloric Stenosis.

Robertson, D. E.: *Ann. Surg.*, 1940, 112: 687.

In this report the author considers some of the current hypotheses regarding the cause of congenital pyloric stenosis. He finds that in a total of 278 cases, 51.8 per cent were first-born in contrast to 41.2 per cent of first-born children in a group of 11,497 births in the city of Toronto. This excess number of cases among the first-born is in agreement with the findings of others. He finds an excess of twins among his series of cases, the number being 1 in 83 births for all Canada, while the series of pyloric stenosis cases yielded twins in the ratio of one pair of twins in every 36.3 births. Sheldon has also found an undue number of twins among the patients with pyloric stenosis. There were 12 pairs of twins in Robertson's series, nine of which were definitely fraternal, and in all these

one twin only was affected. One pair was doubtful; both were males and only one was affected. Two pairs were identical and both members were affected in each pair. This finding of but one of fraternal, and both of identical twins affected is in favour of the idea that congenital pyloric stenosis has a genetic basis. Of the 430 cases in which sex was given, 81.9 per cent were males and 18.1 per cent females. The predominance of the male sex is also in agreement with the findings of other authors.

MADGE THURLOW MACKLIN

### Anæsthesia

#### The Use of Neosynephrin Hydrochloride in Maintaining Blood Pressure During Spinal Anæsthesia. Silvers, H. I. and Leonard, I. E.: *Am. J. Surg.*, 1940, 1: 79.

One of the major problems in spinal anæsthesia has always been the accompanying fall in blood pressure. Epinephrine and, particularly, ephedrine have been used to preserve its stability. Both of these are sympathomimetic drugs and raise the blood pressure primarily by vasoconstriction. In therapeutic doses these both increase the efficiency of the heart and cause an increase in the cardiac rate, but they have the objectionable feature of stimulating the central nervous system at the same time, which is undesirable in a conscious patient. Palpitation, throbbing of the head, etc., are other symptoms complained of by patients receiving ephedrine in large doses.

Neosynephrin hydrochloride is a synthetic drug resembling epinephrine and ephedrine both structurally and pharmacologically. The essential difference between epinephrine and neosynephrine is the additional hydroxyl group contained in the benzene ring of the former. Neosynephrin causes a rise in blood pressure as effectively as ephedrine without stimulating the central nervous system and without a resulting tachycardia. On the contrary, neosynephrin when injected subcutaneously in normal subjects produces a definite bradycardia. Brunner and de Takats have shown that neosynephrin is just as effective as ephedrine in raising or maintaining a falling blood pressure, and its action is manifest even after repeated doses. Johnston gave twenty-two injections of neosynephrin in therapeutic doses to a patient in post-operative shock at intervals of twenty minutes and each time produced a rise in blood pressure, the patient going on to recovery. The drug is much less toxic than either ephedrine or epinephrine with a relatively high fatal dose as compared with them.

The authors employed neosynephrin in 50 cases of spinal anæsthesia and were impressed by the ready response of the blood pressure, the bradycardia, and absence of nervousness on the part of the patient. Most of the cases were from the department of proctology hence the majority

of the cases had a relatively low level of anæsthesia, mostly below the umbilicus or only slightly above it. The average dose of spinal anæsthetic was 95 mg. of neocaine dissolved in 3.5 c.c. of spinal fluid. Premedication consisted of sodium allurate, gr. 3½, morphine, gr. 1/6, and scopolamine, gr. 1/150.

The neosynephrin was mixed in 1 per cent novocaine and given subcutaneously over the site of puncture. One-half c.c. of a 1 per cent neosynephrin solution was used, followed by lumbar puncture in five minutes and the administration of the spinal anaesthetic.

The average initial rise in blood pressure, approximately 20 points, occurred ten to fifteen minutes after the injection of the neosynephrin and lasted twenty-five to thirty minutes. In only ten cases was the neosynephrin repeated during the operation and the 0.25 c.c. of the 1 per cent solution was given. A definite bradycardia was observed in nearly all cases. The drug did not prove effective in cases where there was loss of blood volume or shock caused by toxic conditions such as peritonitis. Until its exact action on the heart has been proved it is best to use small doses or abandon its use entirely in cases which present serious cardiac involvement.

F. ARTHUR H. WILKINSON

### Obituaries

**Dr. Ithamar Gordon Bogart**, of Kingston, Ont., died on January 13, 1941. Dr. Bogart was born at Berwick, near Cornwall in 1869, and was educated at Morrisburg, and at Ottawa normal school. Later he taught school at Highgate in western Ontario for six years and then came to Queen's University, graduating as honour student in medicine in 1901. He won medals in medicine and surgery and opened practice in Kingston in 1902.

He was demonstrator in surgery at Queen's University from 1904 to 1912, and in 1919 was lecturer in surgery, later becoming assistant professor. He retired from active practice in 1938.

**Dr. George Wellington Brown**, of Shelburne, N.S., died on January 3, 1941. He was seventy-seven years of age and a graduate of New York University (1893).

**Dr. Thomas Edward Case**, of Toronto, died on December 6, 1940, in his 86th year. He had practised in Dungannon, Ont., for forty-five years. Dr. Case was born in Usborne Township, Huron County, where he received his early education. He attended Toronto Normal School and McGill University, and graduated from the Toronto Medical School in 1883. He moved to Toronto from Dungannon 12 years ago.

**Dr. E. L. Garner**, of Vancouver, B.C., died on December 27, 1940. Dr. Garner was born in Ontario in 1874, near Niagara Falls, where his parents were pioneer residents. He graduated from the University of Toronto in 1898 and came to British Columbia about 1913, where he was in partnership with Drs. Bonnell and Asselstine at Fernie, and later went to Cowichan Lake. In 1926 he came to Vancouver to practise.

**Dr. Hector Clayton Hall**, aged 50 years, a well-known Fort Qu'Appelle, Sask., physician, died at his home on December 20, 1940. He was coroner at Fort

Qu'Appelle, and was very widely known throughout the southern part of the province.

Dr. Hall spent his entire life in the valley town, having been born there. His father, Dr. William Hall, arrived in Fort Qu'Appelle in 1884. Dr. Clayton Hall received his early education there, and graduated from the University of Toronto in 1912. He was assistant A.D.M.S., second division, during the first Great War. He was an honorary member of the A.F. and A.M., Toronto, and a member of the Qu'Appelle Valley lodge. He was past district deputy and a charter member of the Qu'Appelle Rotary club and Board of Trade.

**Dr. Alexander Edward Kennedy** died at his home in Mabou, N.S., on January 8, 1941. He was 77 years of age, and survived the death of his wife by only a few days. Born at Kinloch, Dr. Kennedy studied medicine at the College of Physicians and Surgeons, Baltimore, graduated in 1893, and returned to his native province. Through forty-five years he served the people of Mabou and the surrounding country. A powerful physique helped him to carry out faithfully and with ardour his duties. He died loved and respected by those he had served.

**Dr. Thomas Morrison Lawton** died on December 20, 1940, at Berkley, Mich., in his eighty-fifth year. Dr. Lawton was born in Yarmouth Township where he attended rural school prior to his father moving to the fifth concession of Howard Township. He attended the Chatham Collegiate Institute and went thence to the Trinity Medical College in Toronto. After graduating (1884) he then took post-graduate work in Scotland (L.R.C.P. Edin., 1884) following which he took hospital work in the old country. For a period after that he was ship's surgeon on a boat travelling between England and India.

Following his marriage in Scotland he returned to Canada and began practice at McKay's Corners near Ridgetown. He again returned to Scotland and became medical examiner for an insurance company and after a time returned to begin a practice in Detroit which he kept for many years prior to coming to Ridgetown in 1917. He remained in Ridgetown until the death of his wife a few years ago when he returned to Michigan to live with his son.

Dr. Lawton was a descendant of one of Canada's historical families, his grandfather being George Lawton, a graduate of Cambridge and a captain in the rebel army of 1837. The rebel Lawton escaped to the United States after that debacle but was finally pardoned under the royal signature of the Queen and that official pardon has been in the hands of Dr. Lawton for many years.

**Dr. John William Scott McCullough**, of Toronto, died on January 5, 1941. He was born in 1868 and a graduate of Trinity University (1890). He held the diploma of D.P.H. (Toronto).

The death of Dr. McCullough will be particularly regretted by health and social workers, and all who are in any way connected with or interested in public health and welfare work in Canada. Dr. McCullough belonged to the small band of pioneers to whose efforts this country owes its progress in hygiene, sanitation and the public health system whereby disease can be controlled and the good health of the populace furthered.

For fifty years, Dr. McCullough had been devoting himself to public service. He became interested in the cause of the public's health at the beginning of the century when, first as chairman of the school board and later as mayor of Alliston, Ontario, he caused the improvement of the sanitary conditions of Alliston's school buildings. From 1910 to 1935 he served the Province of Ontario in the capacity of chief officer of health and deputy registrar-general. During his tenure of office there were established the system of district health officers and the free distribution of diphtheria anti-toxin and other biological products for the control of communicable disease. Dr. McCullough

was also during this period instrumental in re-organizing the provincial department of health and in providing, throughout the province, a chain of travelling tuberculosis clinics and public health laboratories for the free diagnosis of venereal disease.

Early in his career he became known as a leading expert on public hygiene and sanitation. In 1913, as a member of a provincial commission, he toured Great Britain and Europe studying sewage disposal and public sanitation measures, and also participated in the waterway survey of the Great Lakes. When the typhoid epidemic broke out in Ottawa in 1911, his exhaustive investigations of its causes, and his personal efforts brought about radical changes in that city's system of water supply, sewage disposal and public health administration. The pasteurization of milk was a cause to which Dr. McCullough devoted himself especially in recent years. Upon his retirement from the government service he continued his activities in behalf of public health through his association with the Health League of Canada. He leaves behind him a considerable volume of articles on the subject of public health, as well as a book entitled "Ten Years' Progress". He served with distinction throughout the last war, and retired in 1919 with the rank of lieutenant-colonel. His beneficent influence will be felt for a long time.

**Dr. Vincent Arthur McDonough**, of Toronto, died on December 28, 1940. He was chief of the medical service at St. Joseph's Hospital and had been associated with this hospital since its formation. At one time he was on the staff of St. Michael's Hospital. Dr. McDonough was born at Kleinburg, Ont., in 1884 and received his early education at Weston High School, graduating from the University of Toronto in 1914.

**Dr. Lewis Rutherford Murray** died at his home at Sussex, N.B., on December 24, 1940. Dr. Murray was seventy years of age, had been educated in the Public School at Sussex, and obtained his medical degree at Jefferson Medical College in 1892. For forty-four years he practised his profession in Sussex where he took an outstanding position in civic affairs. He held positions as alderman and mayor on several occasions, and was one of the several physicians responsible for the excellent condition of the finances of this almost model town in which the relief problem has been handled in an excellent manner. Dr. Murray took part in the Boer War, Great War of 1914-18, and in the present war did much in the early days of organization and in the examination of recruits. He was also in charge of the Camp Hospital in Sussex during the first several months of the present conflict. His funeral was attended by leading citizens from all points of the province and the large and distinguished crowd at the funeral was an evidence of the appreciation extended to him for a lifetime of service.

**Dr. Robert Oliver**, of Hamilton, Ont., died on January 8, 1941. He was the son of the late Hon. T. J. Oliver, a former premier of British Columbia and was born in 1887. He was a graduate of McGill University (1916). Dr. Oliver was a member of the Ontario Old Age Pension Board for many years, and in the early years of his practice served in hospitals in Montreal and Detroit.

**Dr. Norman Wilfred Rogers**, of Barrie, Ont., died on December 17, 1940.

Dr. Rogers was born in Barrie in 1885, the son of the late Mr. and Mrs. Thomas Rogers. He received his early education in the West Ward, now Prince of Wales School, and Barrie Collegiate Institute.

After graduation from the Faculty of Medicine, University of Toronto, in 1910, Dr. Rogers practised in Cochrane, Haileybury, and with the Grand Trunk Pacific Construction Company, ahead of steel, 60 miles west of Hearst.

In 1912 he took over the practice of the late Hon. Dr. L. J. Simpson, at Stroud, and later moved to Elm-

vale. In 1917 he was appointed Medical Officer with the Royal Flying Corps at Camp Borden and at a northern internment camp. The same year he went overseas, where he was attached to Bramshott and Witley Camps.

In 1937 he was appointed Medical Officer of Health for Barrie.

Dr. Rogers was an active member of Trinity Anglican Church. He served two years on the Board of Education and was active with the Red Cross and Victorian Order of Nurses.

**Dr. Walter Herbert Taylor**, of St. Mary's, Ont., died on January 10, 1941, in his sixty-eighth year.

Dr. Taylor was the son of the late Rev. George Irwin Taylor, one-time rector of St. Bartholomew's and St. Augustine's Anglican Churches, Toronto. He was born at Perrytown, Ont., and received his early education at the old Church School, Toronto, and Trinity School, Port Hope. He graduated in medicine from Trinity Medical College (1896). He first established a private practice at Thessalon, and later in Port Arthur, where he was located at the outbreak of the war in 1914.

He served as medical officer with the Brampton Regiment. After some time in active service in France he was appointed to the staff of the Red Cross Hospital at Buxton, England.

Following the first Great War, Dr. Taylor was attached for several years to the military hospital at Guelph before opening a private practice in St. Mary's.

**Dr. Smith Layton Walker** died at Pictou, N.S., on January 8, 1941. He had been living at the Maritime I.O.O.F. Home during the past three years, following apoplexy. Dr. Walker was seventy-six years of age. His birthplace was Truro, where he practised after his graduation from Bellevue Hospital Medical College in 1890. During the Great War he served overseas with the R.C.A.M.C., and then returned to Halifax where he was attached to the staff of Camp Hill Hospital. Dr. Walker will be remembered best for his activities as secretary of the Nova Scotia Medical Society and managing editor of the *Bulletin* which bore his many thoughts through Nova Scotia and across the Dominion.

## News Items

### Alberta

The Alberta Government has appointed Dr. George H. Malcolmson, radiologist, of Edmonton, director of cancer services. He will have the responsibility of establishing cancer diagnostic and treatment clinics for Alberta. It is planned to have two centres at the present time, each with an internist, a surgeon, a pathologist and a radiologist. The government has set aside the sum of \$50,000 for this purpose for 1941, and while its plan is somewhat limited in scope the results of the first year's work will no doubt warrant further changes and enlargements.

Recently Dr. Malcolmson met the Calgary Medical Society and outlined to it what was contemplated for the first year. Surgery for the present is not included in the treatment, which is being limited to radium and x-ray treatment of curable cases. The patient will have to provide his own transportation to the centres and his hospitalization or board while there.

The annual elections to the Council returned the former representatives for the districts concerned, *viz.*: District No. 2, Dr. A. Cherry, Lethbridge; District No. 4, Dr. W. V. Lamb, Camrose; District No. 6, Dr. R. B. Francis, Calgary.

The regular meeting of the Council has been called for Edmonton, January 22, 1941, when it is expected that the question of fees for medical services to the

injured workmen will be up for discussion. The present schedule was agreed to in December, 1934, and the Workmen's Compensation Board considers the question of fees should come up for consideration at this time.

Col. H. K. Groff, M.D., formerly medical officer of the Workmen's Compensation Board, has been transferred to Newfoundland to assume military duties there.

At a recent meeting of the University Committee on specialists, the following were recommended for specialists' certificates: Eardly S. Allin, F.R.C.S. England, Edmonton, Surgery; Roy W. Culver, Calgary, Eye, Ear, Nose and Throat; Kurt Fuchs, Edmonton, Eye, Ear, Nose and Throat; M. K. MacGougan, Lethbridge, Eye, Ear, Nose and Throat.

Dr. A. P. Asselstine, of Alexo, has gone to Orillia, where he has taken over a practice.

Dr. Walter S. Anderson, son of Dr. A. F. Anderson, Medical Superintendent, of the Royal Alexandra Hospital, who has completed five years of post-graduate work in surgery, has joined the Baker clinic in Edmonton.

Word is received that Dr. W. W. Bell who has been ill for three years has sufficiently recovered to return to the practice of medicine. He was formerly at Vermilion, Alberta, and is now in Victoria, B.C.

For the year 1939-40 the following social services cost the province as follows: nursing branch, \$40,000; travelling clinic, \$12,000; child welfare, \$72,000; mothers' allowances, \$637,000; poliomyelitis, \$18,849; hospital *per diem* grants, \$472,000. G. E. LEARMONT

### British Columbia

A very large number of the British Columbia medical profession is now engaged in military service. A list of men now somewhere in Great Britain includes the following names: F. H. Bonnell, W. L. Boulter, W. M. Carr, of Victoria; J. U. Coleman, of Duncan; B. H. Cragg, of New Westminster; H. R. L. Davis, H. A. DesBrisay, J. A. F. Elliott, A. C. Gardner Frost, J. F. Haszard, of Kimberley; J. A. Ireland, P. S. Tennent and H. A. Robertson, of Kamloops; J. A. MacMillan, W. E. M. Mitchell, R. J. Nodwell and Andrew Turnbull, of Victoria. Others who are doing war work in Great Britain are: Drs. W. J. Elliott, W. A. Morton, H. P. Swan, A. N. Reid, H. Mallek and O. E. Kitzwiser.

In addition to that some fifty-eight other members are engaged in Medical Services, either in or out of the province.

Other men are constantly joining up. The result of this large number of medical men leaving private practice has had a sensible effect upon general civilian practice, especially in the cities where a fairly widespread epidemic of influenza has kept everyone very busy.

Dr. Irene M. Clearihue, wife of J. B. Clearihue, K.C., of Victoria, left shortly after the war commenced to do post-graduate work. She is now on the staff of the Montreal General Hospital and largely engaged as an anæsthetist. Dr. Clearihue has never practised in British Columbia, but is a graduate of the London Hospital.

Dr. G. F. Amyot, Provincial Health Officer, addressed the Vancouver Medical Association on January 7th, the subject of his address being "Public health and the practice of medicine". This makes the second address given by members of the Public Health Department of the Province, the other being an address given last month by Dr. S. Stewart Murray, Senior Medical Health Officer of Vancouver. This interchange of the preventive and therapeutic sides of medicine is proving to be a step in the right direction.

Dr. Murray gave a very comprehensive review of health matters affecting Greater Vancouver, and his remarks covered such things as milk pasteurization. In re-

gard to this, he pointed out that some 83 per cent of the milk coming into Vancouver is pasteurized, and dwelt on the necessity for further work in this direction. He told us that the City Council is attempting to get from Victoria legislation covering *Brucella abortus* in herds. This, if obtained, will do much to secure the desired end. Dr. Murray referred to the work of the Metropolitan Health Board, which in the words of one of the secretaries of the Rockefeller Foundation, "justified the grants made by the Foundation for this purpose." It is of interest to note that certain municipalities, which have hitherto stood aside from the operation of this Board, are now beginning to seek admission.

Recently, notices appeared in the press with regard to British Columbia oysters which are invading the eastern market. Here there is urgent need for the greatest possible care to avoid any possible contamination, and Greater Vancouver has, in common with other parts of Canada, a special interest in this matter. Dr. Murray referred to this in his remarks.

He spoke of the water supply of Vancouver, which comes from mountains on the lower slopes of which ski camps, logging camps, etc., are to be found, and referred in some detail to the precautions taken to avoid any possible injury to the water supply from these sources.

He then enlarged upon pre-natal and school work carried on by the Metropolitan Board, and urged medical men to do all in their power to promote immunization, especially against diphtheria. He made reference to the fact that the most up-to-date opinion about this disease emphasizes the necessity for recurring doses of toxoid.

J. H. MACDERMOT

### Manitoba

At a meeting of the Section of Obstetrics and Gynaecology of the Winnipeg Medical Society on January 14th, Dr. J. D. McQueen, Chairman of the Maternal Mortality Committee of the Canadian Medical Association, read a paper dealing with the maternal deaths reported on the Manitoba Pregancy Survey for the period of May 1, 1938, to April 30, 1940. The maternal mortality rate for this group was 3.26 per thousand live births. If Indians, who form only 2 per cent of the population of the province, were excluded the maternal mortality rate would be 2.2 per cent. Among those present at the meeting were Dr. E. W. Montgomery, former Minister of Health and Public Welfare who did much during his term of office to reduce the preventable maternal deaths, Dr. F. W. Jackson, Deputy Minister of Health, and Dr. Noel R. Rawson, Director of Vital Statistics.

The Winnipeg Medical Society hopes to be able to make arrangements for a lecture to be given to the medical profession between February 20th and March 8th by Dr. Henrik Dam, of Copenhagen, the discoverer of vitamin K.

At the annual meeting of the Honorary Attending Staff of the Winnipeg General Hospital Dr. W. E. Campbell, head of the Department of Ophthalmology, stated that a donor who wished to be anonymous had offered to equip an eye room in the Winnipeg General Hospital.

Opening of the new nurses' residence at Eriksdale, Manitoba, built at a cost of \$4,000 by the Women's Missionary Society of the United Church in Canada, took place December 14, 1940. The residence is a two-storey building, well equipped. Its opening will permit six beds and an operating room in the hospital space vacated by the nurses. During the afternoon open house was held under the guidance of Nurse Hilditch, superintendent of the hospital, with the assistance of the staff, Laura Hay, Gertrude Boulton and Vina Salchart. In the evening many residents of the town paid a visit.

The Faculty of Medicine announces a three-day post-graduate course to be held on March 6, 7, 8, 1941. This course will deal with modern methods of diagnosis and

treatment. One full day each will be taken over by the departments of Medicine and Surgery. A clinical-pathological conference, a tumour clinic, and an afternoon session on public health problems will round out the program.

The number of doctors donning military uniforms increases daily. Recently noted were Dr. J. D. Stirling, M.C., of Winnipeg, Dr. Harry Atkinson, Superintendent of the Home for the Aged and Infirm at Portage la Prairie, and Dr. S. Jauvoish, of Winnipeg. Dr. Stirling and Dr. Atkinson are on H.Q. staff of M.D. 10, and Dr. Jauvoish is in charge of the Portage la Prairie training centre.

Major John A. Hillsman has been appointed surgeon of the military hospital at Fort Osborne.

Considerable changes in accommodation for the public and semi-private patients in the Winnipeg General Hospital are contemplated.

There is a marked decrease in the number of patients receiving medical care under the Unemployment Relief Department of Winnipeg owing to the unemployment rate being greatly lowered.

Ross MITCHELL

### New Brunswick

Dr. W. O. McDonald of the Staff of the Saint John General Hospital has been elected to Fellowship in the American College of Physicians.

On December 15th a serious fire in the Gloucester Hospital at Bathurst caused \$100,000.00 worth of damage and the deaths of four patients. The devotion and heroism of the staff and townspeople saved the death toll from being greater.

Dr. Ronald Baird who at the time of the outbreak of war was doing post-graduate study in London joined the R.A.M.C. and has recently been promoted to the rank of captain.

The Saint John Tuberculosis Hospital celebrated its twenty-fifth anniversary on December 10, 1940. At the luncheon provided by the Board of Commissioners the chief speaker was Dr. H. A. Farris, who was the first superintendent, and to whose efforts a great deal of the success of the institution may be traced. He described early difficulties due to the opposition of patients and friends of patients to the idea of hospitalization for long periods. The present state of this splendid institution was described by Dr. R. J. Collins, the present superintendent.

This Hospital, in an increasing degree, is showing the way towards the control of tuberculosis in Eastern Canada. The Children's Department and the Chest Surgical Department have for many years been outstanding, even in institutions devoted entirely to tuberculosis.

A. STANLEY KIRKLAND

### Nova Scotia

Nova Scotia public health officials held a two days' conference in Halifax, and expressed themselves as satisfied with the health conditions of the province. Increased shipping during the past year has made the port of Halifax the most exposed to contagious disease of any, on this continent at least. Diphtheria has been epidemic, and there have been several cases of spinal meningitis, but it was felt that, under existing circumstances, public health control was good. Port medical facilities have been expanded and plans were made to increase the efficiency of new units, to develop co-operation among them. The city has made added grants to its Board of Health, and appointed an assistant to City Health Officer, Dr. Allan Morton. Working with the provincial health department and the medical arms of the services, it is felt that there is little danger of any major epidemic.

Sir Frederick Banting, R.C.A.M.C., addressed Dalhousie medical students while on a recent visit to Halifax.

The Mutual Hospitalization Group, of St. Martha's Hospital, Antigonish, patterned on the many co-operative group movements throughout Nova Scotia, now has a membership of more than one hundred.

ARTHUR L. MURPHY

### Ontario

Toronto reports an exceptionally favourable record for 1940 with respect to the control of communicable diseases. The city may now pride itself on the outstanding achievement of having witnessed, for the first time, a year free from the occurrence of a single resident case of diphtheria. This enviable record for a city of 649,000 population crowns the persistent efforts directed by the Department of Public Health towards the eradication of this preventable disease which in 1929 and again in 1930 was responsible for upwards of 1,000 cases with 64 and 54 fatalities respectively. The year 1940 also marks the third occasion without a single death from the disease, repeating the performance of 1934 and 1937.

Typhoid fever was reduced to a new minimum of 12 cases during 1940, while the incidence of poliomyelitis amounted to only 9 cases. No fatalities occurred due to measles. The complete absence of small-pox is noted since 1932, and there has been no death during the past thirteen years from this cause. Collectively, the 1940 morbidity figures for typhoid, scarlet fever, measles, whooping-cough and diphtheria totalled 1,905 cases, as against 12,250 cases a year ago, with resulting fatalities dropping from 39 to 12, the lowest point as yet recorded for mortality among this particular group of diseases.

The more minor communicable diseases, mumps, chicken-pox and German measles, on the other hand, show a substantially increased incidence as indicated below:

	<i>Cases</i>		<i>Deaths</i>	
	1940	1939	1940	1939
Typhoid fever }	12	24	2	2
Paratyphoid fever }	—	—	—	—
Scarlet fever .....	976	2,248	3	25
Measles .....	272	8,851	—	8
Diphtheria .....	—	7	—	1
Whooping-cough .....	645	1,120	4	3
Poliomyelitis .....	9	17	1	2
German-measles .....	815	263	—	—
Mumps .....	4,893	1,892	—	—
Chicken-pox .....	4,628	3,441	—	1
Meningitis .....	29	6	5	—
Erysipelas .....	45	100	6	6
Small-pox .....	—	—	—	—

The substantial improvement of more than 18 per cent in the tuberculosis mortality in 1939 over the previous low mark was not only maintained during 1940 but was fractionally lower as indicated by a rate of 29.9 per 100,000 population. The rate for 1939 was 30.0 and the previous low was 36.9 for 1937. Tuberculosis mortality has been cut in half since 1930 and since 1910 it has fallen 77 per cent. In consequence this disease has been relegated to seventh place among the principal causes of death.

The statistics briefly outlined in the foregoing reflect a gratifying response to the various methods of preventive practice and control designed to improve public health in the City of Toronto.

The general death rate shows a rising tendency, increasing from 11.0 to 11.5, due mainly to increases of 300 deaths from diseases of the heart, arteries and kidneys, 97 from cancer and 31 from accidental and violent causes. Counterbalancing to some extent these increases were substantial decreases of 161 deaths from pneumonia and influenza and 39 deaths from communicable diseases. proportion of those surviving to 50 years of age is becoming much higher than formerly; therefore the returns for deaths from the so-called degenerative diseases are bound to show marked increases from year to year.

In addition to the reconditioning of the wing at Christie Street Military Hospital already announced, which will this month bring the accommodation up to 1,250 beds, Colonel McMane announces the opening, at the end of February, of another wing which will increase the hospital capacity to 1,500 beds.

The work of the Outpost Hospitals of the Canadian Red Cross Society must be a great boon to many communities on our frontiers. Haliburton has had a 3-bed hospital in which has many as six patients and four babies have been cared for at one time. An addition now provides a private ward and three public wards, together with an operating room, a utility room, nursery and a large laundry. The furnishings of the hospital have been provided mostly by local contribution.

Dr. Ebenezer Hooper, a graduate of Queen's University, and father of Dr. E. Ralph Hooper, recently celebrated his 94th birthday, and was at home to his friends during the afternoon. He was a professor on the staff of the first Women's Medical College in Ontario,—the one at Kingston,—and was a superintendent of the Kingston General Hospital.

J. H. ELLIOTT

### Quebec

More than 600,000 children in the Province of Quebec benefited by the child welfare advice given by provincial nurses according to a summary for 1940 issued recently by the Department of Health and Social Welfare. Particular attention was given to maternal, infant, and school hygiene by the doctors and nurses of more than 50 health units in the province.

Great precautions against diphtheria were taken during 1940 and doctors gave 123,500 anti-diphtheria injections, including 42,406 complete immunizations. In addition 882 persons who had come in contact with scarlet fever were immunized against this disease.

In the field of child care, doctors of the department held 5,989 clinics at which nearly 100,000 babies under one year of age were examined. In addition, nurses made 45,110 post-natal and pre-natal visits, and visited 138,906 children under school age in their homes.

An additional 133,697 children were given physical examinations at their schools during the year.

On a récemment confié au Dr C. A. Gauthier la direction médicale du Comité de Protection Civile pour la zone métropolitaine de Québec.

Il convient de signaler la parution en décembre dernier du premier numéro de la revue "Nos enfants", publiée en supplément mensuel à "La Famille". "Nos enfants" est l'organe officiel de "L'Ecole des parents du Québec"; cette revue est dirigée par le Dr Albert Guilbeault, M.D., F.A.A.P., et publie des articles de vulgarisation sur la puériculture, l'hygiène infantile et la prophylaxie des maladies les plus communes de l'enfance.

L'Université de Montréal a inauguré le 15 janvier une série de cours sur la médecine militaire. Ces cours ont lieu à 8 hrs. p.m., à la salle 214 de l'immeuble de la rue St-Denis, et se poursuivront jusqu'au 7 février. Le programme suivant a été choisi:

1. Les gaz de combat et les moyens de se protéger contre eux: Professeur Louis Bourgouin, 15 janvier.
2. Les méthodes de transfusion sanguine et la détermination des groupes sanguins: Dr Albert Bertrand, 17 janvier.
3. Les procédés de localisation et d'extraction des projectiles de guerre: Dr Léo Pariseau, 20 janvier.
4. Le traitement des plaies de guerre: Dr J. U. Gariépy, 22 janvier.
5. L'organisation et le fonctionnement des services ambulanciers militaires: Dr J. M. Roussel, 23 janvier.
6. L'histoire de la médecine militaire et de ses grands hommes: Dr Eugène St-Jacques, 27 janvier.
7. Les phénomènes de choc: Dr Mercier Fauteux, 29 janvier.

8. L'hygiène des camps militaires: Dr J. A. Beau-douin, 30 janvier.

9. Les fractures ouvertes: Dr Armand Paré, 3 février.

10. Les maladies vénériennes: Dr Albéric Marin, 5 février.

11. La blennorrhagie: Dr Lucien Sylvestre, 7 février.

Le Dr Gaston Lapierre, professeur de pédiatrie à l'Université de Montréal vient d'être nommé membre de la commission consultative d'hygiène de la cité de Montréal.

Le Dr Fabien Gagnon a été nommé directeur du service d'obstétrique de l'hôpital du St-Sacrement de Québec. A ce même l'hôpital, les membres du bureau médical ont élu président le Dr Renaud Lemieux.

JEAN SAUCIER

### United States

A New Journal entitled *Medical Care* is to be published shortly by the Williams and Wilkins Company, of Baltimore, for the Committee on Research in Medical Economics, Inc.

A forum of signed expressions of opinion by individuals or agencies; non-technical reports of scientific studies of the medical, administrative and financial experience of plans of organized care in the United States; news of the field; and summaries of reports appearing elsewhere are promised to readers of the new journal.

*Medical Care*, it is stated, "considers equally the interests of the people who receive medical care and of the professions that furnish it. It seeks to promote co-operative research, planning and action by the professions and the public, in their common interest."

The editorial advisors of the new journal include members of the medical and allied professions, social scientists, public administrators, and men and women informally representing labour, agriculture, employers, and social work. Besides these, the new journal has an editorial board composed of the following:

Dr. Ernst P. Boas, New York City; Dr. Samuel Bradbury, Philadelphia; Dr. Claude W. Munger, New York City; Dr. John P. Peters, New Haven; Dr. C.E. A. Winslow, New Haven; Dr. Herbert E. Phillips, Illinois; Dr. Kingsley Roberts, New York City; and George Soule, economist, New York City.

**Announcement of the Van Meter Prize Award.**—The American Association for the Study of Goitre again offers the Van Meter Prize Award of \$300 and two honourable mentions for the best essays submitted concerning original work on problems related to the thyroid gland. The Award will be made at the annual meeting of the Association which will be held at Boston, Mass., May 26th, 27th and 28th, providing essays of sufficient merit are presented in competition. The competing essays may cover either clinical or research investigations; should not exceed three thousand words in length; must be presented in English; and a typewritten double spaced copy sent to the Corresponding Secretary, Dr. W. Blair Mosser, 133 Biddle Street, Kane, Penn., not later than April 1st.

### General

**Food and Drugs Act Amendment.**—In our issue of November, 1940, page 504, *q.v.*, we published in detail new regulations of the Federal Government relative to the description and labelling of drugs and food products concerned with certain vitamins. These regulations were to take effect on January 1, 1941. We are now informed that in virtue of an Order-in-Council (P.C. 7539), dated December 21, 1940, the effective date for the enforcement of the new orders has been advanced to July 1, 1941. This has been done as a result of representations from many sources that an opportunity should be given to all interested parties to present their views.

### Book Reviews

**The Soldier's Heart and the Effort Syndrome.** T. Lewis. 2nd ed., 103 pp. 8s. 6d. Shaw & Sons, London, 1940.

This book appears at an opportune time. Indeed it is because a "new war has come upon us" that Sir Thomas Lewis revised the first edition. The significance of the problem becomes obvious when it is learned that of 70,000 soldiers classed as cases of cardiovascular disease during the war of 1914-1918 only "one in every six suffered from heart disease and the rest were 'effort syndrome' cases". As this condition occurs in civilians of both sexes as well as in soldiers the first practical procedure is to discover it among recruits. Due emphasis is given to the fact that ordinary methods of physical examination are inadequate. In order to test the capacity of a man to perform work he must be observed while at work. The chapter which deals with examination of recruits will be found very informative by medical officers who are called on to do such work. The simple tests of cardiac function by graded exercises are not automatic but demand close study of the recruit by a trained observer whose judgment improves with experience. The application of these methods of selection should eliminate at least half the cases of "effort syndrome" that might develop if no exercise tests are used.

This book is unique in the literature on cardiovascular disease. The author has had about twenty-five years' experience in studying "effort syndrome", mainly in soldiers. The broad conception of its relation to sociology and the more specific details of diagnosis, prognosis, and treatment are dealt with in masterly fashion. A close acquaintance with its contents must be a *sine qua non* to both military and civil physicians, nurses, and instructors in physical drill. The chief symptoms and signs of effort syndrome, breathlessness, palpitation, fainting, giddiness, sweating, tachycardia, hypertension, are not specific for this condition. They are common to a large variety of diseases and may be compatible with normal health. To evaluate them satisfactorily one must be familiar with the "effort syndrome" as it is described by Sir Thomas Lewis.

**Organization, Strategy and Tactics of the Army Medical Services in War.** Lieut.-Col. T. B. Nicholls. 2nd ed., 488 pp. \$4.50. Macmillan, Toronto, 1940.

The first edition was reviewed in these columns December 1937, p. 616. This second edition contains about 100 additional pages due principally to the inclusion of chapters on Air Transport of Casualties, the Medical Services of an Anti-Aircraft Division, and an account of the Emergency Medical Services covering the treatment of service casualties in civilian hospitals.

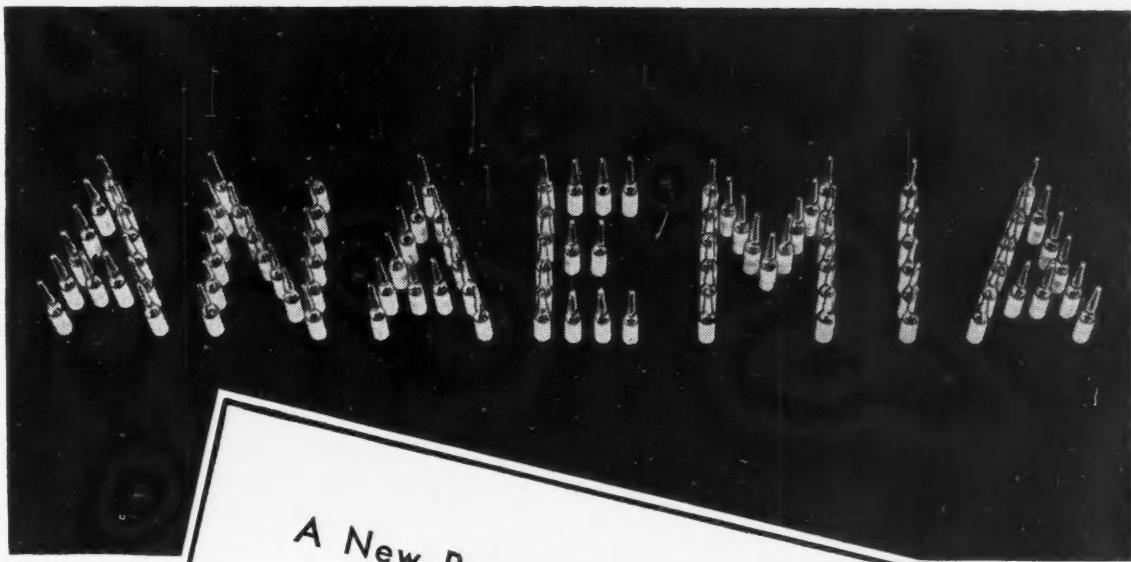
Criticism may be offered that while based on a very wide experience in the last war and recently revised there is much in the medical manuals which does not find place here. Yet much that has been devised to meet present-day warfare may not yet be published. It is an excellent academic production.

In the words of our previous reviewer, junior officers will find this book invaluable, and by senior officers the work will be found most helpful in the preparation of lectures and demonstrations.

**Official History of the Australian Army Medical Service in the War of 1914-1918. Vol. 2. The Western Front.** Col. A. G. Butler. 1010 pp. 21s. Australian War Memorial, Canberra, 1940. May be procured from the Australian Trade Commissioner, 15 King St. W., Toronto.

This is the second of three volumes comprising the official Australian Medical History of the last war. The first volume has already been reviewed in this *Journal* (see 1931, 25: 760).

The work deals with the period during which the Australian Imperial Force was in France from the Spring of 1916 to the end of the war. It is in three sections.



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I and III are in narrative form, relating the experience of the Australian Army Medical Corps in the field. Section II is a study "of the problems of siting and working the machinery of evacuation, from the Front Line to General Hospital and back; of preventing disease and promoting health."

In the narrative chapters a short description of the general situation preceding each battle or period under consideration is followed by the story of ensuing events. This makes it easy to understand the subsequent description of the work of the Medical Corps—why evacuation was easy or difficult, why wounded were in good or bad shape, why they were in greater or fewer numbers. This reviewer read Sections I and III particularly with deepest interest and pleasure, and with a sincere admiration for this method of presenting the story of what happens to the wounded and sick soldier.

This book covers every phase of Army Medical work on Active Service in France, and it is so readable that it might well be studied and used as a reference by any Canadian Medical Officer who is proceeding on active service for the first time.

**Neuroses in War.** Edited by E. Miller. 250 pp. \$3.00. Macmillan, London, 1940.

During the early months of the war psychiatrists in England devoted many articles in medical journals to the subject of psychological disorders in time of war. Because of the absence of violent battle activity, either overseas or at home, and the consequent lack of much clinical material of this type, these contributions took the form of reviews, accounts of methods used in the last war, and suggestions as to the organization of proper psychiatric services in this war.

Many of these articles have been collected together, others added to them, and the whole integrated and edited by Emanuel Miller in book form. In the light of the events of the last six months, when the Flanders evacuation and wholesale civilian bombing have resulted in an increase in the number of psychiatric casualties the predictive parts of the book are very interesting. Recent communications from England indicate that the treatment, by and large, of acute mental and functional disorders follows the principles suggested in this book, namely: (1) Immediate rest, warmth, reassurance and sedatives, followed by some sort of review with the patient of the events which brought about the difficulty; and (2) in more serious cases, deep narcosis for over a week, followed by the usual reassurance, positive suggestion, persuasion, and organized and purposeful activity.

Also interesting are the suggested plans for psychiatric services described, many of which are now in actual operation in England through the military, naval, air force and civilian medical services.

The book contains contributions by such well-known authorities as Crichton Miller, Hadfield, Hargreaves, Dillon, Millais Culpin and others. There is a good review of the literature by Wittkower and Spillane, which appeared previously in the *British Medical Journal*.<sup>1</sup> Other chapters are devoted to the mode of onset, diagnosis, and treatment of psychoses. The chapter on somatic relationships and their importance in understanding the clinical signs and symptoms is very timely, as is the chapter on the various psycho-pathological theories relating to the cause of the neurosis. Dillon's chapter on advanced psychiatric treatment centres in the field is essentially the same article which appeared in the *British Medical Journal*.<sup>2</sup> The chapter by Bion on the "War of Nerves": Civilian Reaction, Morale and Prophylaxis, is the only attempt in the book to include a preventive and mental hygiene point of view. It is well done, however, and stresses the important point that, since all civilians are exposed to danger, all should have the benefit of the discipline, morale, mutual encouragement and sup-

port which participation in some organized military or semi-military part-time work affords.

For the general practitioner or the military medical officer one of the most interesting parts of this book is the Appendix, which contains extracts from such official documents as "The Report of the War Office Committee of Enquiry on Shell Shock, 1922",<sup>3</sup> and the Emergency Medical Service treatment facilities for civilian shock and neurotic casualties. The Appendix also contains a simple classification of the common psychological disorders in war, and a section on pharmacology, with a brief account of the most useful drugs, their dosage, mode of administration and effect.

Collected together in book form, these articles and memoranda constitute a handy manual and practical reference for physicians who expect to treat psychiatric casualties, either in the armed forces or among civilians.

**War Primer on Wound Infection. Causes, Prevention and Treatment.** Edited by W. H. Ogilvie. 96 pp. 2s. 9d. The Lancet, Ltd., London, 1940.

This is a well-timed publication and should serve to bring the subject of wound treatment to the acute notice of the medical profession, not only in the British Isles but also on this continent. The manual involves the facts derived from experience in the Great War together with that of the Winnett-Orr method in the Spanish War as published by Trueta.

Dr. Whitby discusses the biological aspect of wounds, dealing with the reaction of tissues to injury, the mechanism of infection, local and general resistance, and the development of shock.

Dr. Cruickshank devotes a chapter to the bacteriological aspect. The most serious agent is found to be the *S. pyogenes* and the source of this organism is probably the dressings and attendants. The dosage of specific sera in the anaerobic infections is discussed.

Professor Garrod describes the action of antiseptics and their uses. The conclusion drawn is that most antiseptics do more harm than good.

An excellent summary of the use of the sulfanilamide compounds is given by Major Buttle, and the use of sulfanilamide as a local dressing as well as by mouth or intravenous injection is discussed. Sufficient data have not yet been accumulated to establish the best method here, but undoubtedly series of cases treated by a consistent method are required for statistical studies.

Mr. Ogilvie devotes two chapters to the surgical principles and procedure of treatment in different case groups depending on the time factor, i.e., the time between trauma and treatment. The places of debridement, primary and delayed suture, the Carrel method, the Thomas splint with traction, the plaster method, and amputation are soundly delimited.

In summary, the reviewer would like to emphasize the importance of this small manual at the present time and considers it should be one of the compulsory books for study in the Army Medical Corps curriculum.

**Emergency Surgery.** H. Bailey. 4th ed., illust., 944 pp. \$18.00. Macmillan, Toronto, 1940.

This, with few exceptions, is the same text as the third edition published two years ago. Mr. Bailey maintains his high standard of presentation and illustration; thus this volume merits the description of the best work in English on emergency surgery. Some may find this one large volume more cumbersome than the original publication in two smaller volumes.

**Management of the Cardiac Patient.** W. G. Leaman, Jr. 705 pp., illust. \$8.00. J. B. Lippincott, Montreal, 1940.

This is essentially a practical book on the treatment of the patient with cardiovascular disease, based upon a diagnosis in which laboratory, instrumental, and physical methods have been used with due application of their

1. WITTKOWER, E. AND SPILLANE, J. P.: Neuroses in war, *Brit. M. J.*, 1940, 1: 223, 265 and 308.

2. DILLON, F.: Neuroses among the combatant troops in the Great War, *Brit. M. J.*, July 8, 1939.

3. Published by H. M. Stationery Office, Kingsway, London.



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relative value, and in which the heart disease has been classified according to its etiology, and circulatory functional capacity rather than to the structural defect present. Illustrative case reports have been used by the author to draw a picture of the finer details of treatment which may be overlooked in practice. The section on Electrocardiography is clearly written and should be of great assistance to the physician who has not had a clear conception of the application of this method of study of heart disease. There is an extensive bibliography of books and journal articles which may be consulted by the reader who wishes to study in detail some of the phases of heart and circulatory disorders dealt with by the author. Where more than one type of treatment has been recommended there is fair discussion of their relative merits with the author's preference clearly stated.

**Atlas of Cardioroentgenology.** H. Roesler. 124 pp., illust. \$8.50. C. C. Thomas, Springfield, 1940.

Sixty histories of cardiac disease are presented here with their clinical and roentgenological, and, in some 25, their post-mortem findings. To demonstrate these latter, sections of the heart have been made in such planes that they may be correlated easily with the ante-mortem x-ray appearances. Most of the types of disease commonly seen in cardiological practice are represented, and in some cases the progress of the disease over months or years is followed by serial roentgenograms.

The great importance of recognizing by means of x-ray the size of the individual heart chambers is clearly brought out, and is in our opinion the chief feature of the work. The author's method for demonstrating the anatomical relationships of these chambers and the great vessels is complementary to the injection methods of others and is a real contribution to the subject. One could have wished that he had seen fit to include sections of the heart in the oblique positions through the plane of the cesophagus, to show the relationships of the latter.

The book may best be regarded as a supplement to the author's "Clinical Roentgenology of the Cardio-vascular System", and should be studied in conjunction with such a text. It can be thoroughly recommended both to the cardiologist and to the roentgenologist. The publisher is to be congratulated on the clarity with which the figures are reproduced.

**Bone Graft Surgery in Disease, Deformity and Surgery.** F. H. Albee. 403 pp., illust. \$7.50. D. Appleton-Century, New York, 1940.

Twenty-five years ago, at the beginning of the era of bone-graft surgery, Dr. Albee published a monograph on this subject. The present monograph represents the ripe development of his great experience and marks the immense progress which has been made in this field of surgery in a generation.

The book is devoted entirely to the technical aspects of bone-graft surgery in all the various fields in which bone grafts may be used. There is no discussion of the diagnosis of the various surgical conditions and of treatment; only that by bone grafting is described. Within these limits the monograph is excellent and reflects the skill and experience of a master craftsman. An opening chapter on general principles discusses the elements of bone grafting in a broad manner and correlates it to what we know of grafting in other fields, including the grafting and budding of trees. Then follows a chapter on armamentarium in which are described in detail the instruments necessary for good bone-graft surgery. It is a valuable chapter, since in few fields is the surgeon more dependent upon perfect tools. The heart of the book is contained in the seven chapters which follow, each of which takes up a specific application of bone-graft surgery; spine fusion, hip joint, ununited fractures, replacement of bone, plastic surgery, arthrodesing operations and bone-block operations. The technique of all established and proved procedures is accurately described, with adequate illustrations.

Dr. Albee is an optimist whose enthusiasm is aroused by one perfect result from an elaborately technical procedure. Moreover, he is a superb craftsman and freely acknowledges it. Probably few surgeons can obtain as perfect results in the field of bone-graft surgery as can Dr. Albee, and it would be wrong to leave the impression that beautiful results can be obtained as easily as might be thought from reading this book. Nevertheless, these things do not detract from the merit of the book. It is an excellent compendium of modern practice in bone-graft surgery, and should be of value in all hospital libraries and in the libraries of surgeons dealing with bones and joints.

**Obstetrics in General Practice.** J. P. Greenhill. 448 pp., illust. \$3.50. Year Book Publishers, Chicago, 1940.

This book is well printed, comfortable to hold, and easy to read. The subject matter is well arranged, surprisingly complete for such a small volume, and very practical. The views expressed are conservative. The subject matter is up to date, and well chosen references to recent publications are scattered throughout the text. The illustrations are excellent.

The chapters on roentgenography, endocrinology, and puerperal sepsis give the reader the latest views, concisely and clearly expressed. The rôle of sulfanilamide and its derivatives in the treatment of sepsis is well presented. The chapters on ante-partum and post-partum care and minor ailments during pregnancy contain innumerable suggestions for management and treatment that are valuable and practical. Medical complications of pregnancy, such as heart disease, tuberculosis, diabetes, hyperthyroidism, and syphilis are briefly but satisfactorily discussed. Short chapters are devoted to the care of the newborn baby, the premature, and the technique of circumcision. The chapter on the management of labour is particularly good. It is well illustrated and essentially practical. The value of this excellent book could be further enhanced by the addition of a chapter on the management of occipito-posterior positions, and one on the management of the slowly dilating cervix.

This book will prove valuable to the teacher in obstetrics as well as to the general practitioner for whom it has been specially written.

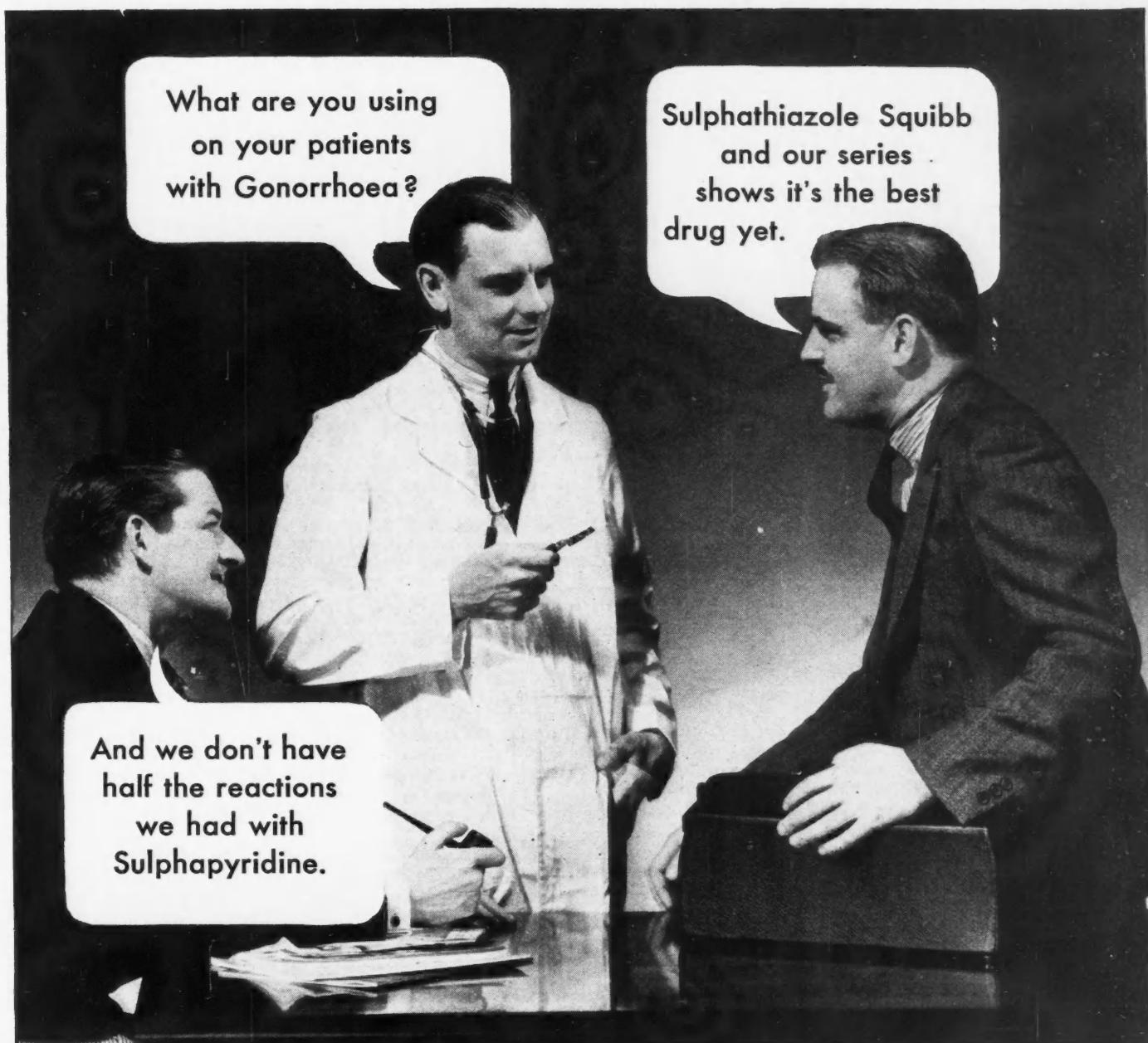
**Treatment of Diabetes Mellitus.** E. P. Joslin, H. F. Foot, P. White and A. Marble. 7th ed., 783 pp., illust. \$8.00. Macmillan, Toronto, 1940.

There are few clinicians who have had such a wealth of experience to draw on for a textbook as Dr. Joslin. His book therefore is a source of knowledge regarding diabetes of unusual value and comprehensiveness. Naturally, with the growth of his clinic there has been a great expansion in problems directly related to diabetes, and he has not shrunk from calling in the aid of those dealing with them. The book is therefore the product of a group of workers all associated with Dr. Joslin for long years. It still retains his clear and simple style, however, which goes far to keep the book in the very first rank of writings on diabetes.

**Endocrine Therapy in General Practice.** E. L. Sevringhaus. 3rd ed., 239 pp., illust. \$2.75. Year Book Pub., Chicago, 1940.

This book describes all the hormones which are now available for clinical use. The function of each hormone is described, symptoms due to lack of each are noted, the commercial preparations are listed, and suggestions regarding treatment are given. Ovarian hormones are the most difficult to keep sorted, but the twenty-three pages devoted to their actions help to clear up confusion in the practitioner's mind.

The author states twice that arteriosclerosis causes diabetes and does not believe that diabetes causes



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arteriosclerosis. He may be correct, but few others who write hold this view. Sixteen diabetic menus are given, but only one has a carbohydrate allowance of more than 90 grams a day. How many patients can be kept contented on half an ounce of bread for each meal? Certainly not the hockey-playing diabetics of Western Canada.

The busy general practitioner and the harassed medical student will welcome this textbook.

**Vitamin Therapy in General Practice.** E. S. Gordon and E. L. Sevinghaus. 258 pp. \$2.75. Year Book Pub., Chicago, 1940.

The authors present a survey of the current concepts and information about nutrition, arranged for the use of the physician who wishes to understand the basic principles of diet, with particular reference to vitamin content in a balanced diet. The far-reaching advances made in the field of nutrition, the recognition and treatment of diseases associated with dietary deficiencies, the availability of synthetic vitamins, and the indications for their use, are subjects of vital interest to the physician, but few can keep in touch with the mass of literature which is appearing, and fewer still are able to assess reports at their true value, especially their value in medicine. The information is to be found here in concise form, with thoughtful comment on what may or may not be of value in clinical application.

**Anatomy of the Eye and Orbit.** E. Wolff, 2nd ed., 374 pp., illust. 31s. 6d. H. K. Lewis, London, 1940.

This work on the anatomy of the eye and orbit, including the central connections, development and comparative anatomy of the visual apparatus, embodies a clear, concise, well illustrated, and modern study of the subject.

The second edition is very similar to the first. It however contains 60 fine illustrations taken from the author's own preparations. Notable among these is a series of flat sections of the retina which are unusual and very instructive. The anatomy of the orbit and eyeball is complete. The chapters on the extrinsic muscles and the motor nerves to the eye muscles are written in a clear and instructive manner. Also, for those who are specially interested there is a chapter on the comparative anatomy of the eye. The whole book is arranged in an attractive manner, is made very readable with the help of clinical adaptations in many places, and on the whole is a book that will be of much value in the practice of ophthalmology. It is very well set up, being of good size, while the paper and print are both satisfactory. The few coloured photographs are excellent.

**Office Urology.** P. S. Pelouze. 766 pp., illust. \$11.50. McAinsh, Toronto, 1940.

"Office Urology" exhibits the same high standard of clear concise medical writing as was to be found in Pelouze's previous publication, "Gonorrhœa in the Male and Female". This new book is well illustrated and is logically arranged.

The sections dealing with sexual function are particularly valuable. Such subjects are frequently omitted from textbooks on urology. The author emphasizes the importance of the rôle played by psychological processes in the production of sexual dysfunction. He displays much common sense in his treatment of this subject.

In the sections dealing with the use of hormones the author points out that many exaggerated claims have been made for the effectiveness of these products. Some products may have been harmful rather than helpful; he does not give those products which have proved to be of definite value sufficient credit.

The symptoms, examination and office treatment of pathological conditions affecting the genital and lower urinary tract are adequately and satisfactorily described. Pelouze is, as usual, very conservative in all matters of

treatment and emphasizes the importance of appreciating psychological as well as physical manifestations of diseases in arriving at a correct diagnosis and in treatment. The diseases of the upper urinary tract are not so thoroughly dealt with, particularly regarding treatment. Urology is a complex subject. It is difficult to separate medical and office methods of diagnosis and treatment from surgical procedures. Consequently, in dealing with many conditions the section on treatment is incomplete and unsatisfactory.

Despite these criticisms, *Office Urology* is a valuable book. It contains much very useful information which is seldom, if ever, to be found in other textbooks, and to this extent it supplements rather than replaces our present books dealing with urology. Every one interested in urology should be familiar with it.

**Diseases of the Urethra and Penis.** E. D'Arcy McCrea. 306 pp., illust. \$6.25. Macmillan, Toronto, 1940.

This book is based on extensive clinical experience in the Salford Royal Infirmary, Manchester, and is said by the author to owe its inception to the stimulus of its chief, Mr. J. B. Macalpine, whose excellent handbook on Cystoscopy is so well known. As might be expected under such auspices it is well written, fairly well illustrated, and covers its limited field in detail. There is little to criticize adversely. Gonorrhœa is perhaps adequately treated but not quite so thoroughly as to the care of the acute stages as one might wish.

The use of oily preparations such as lipiodol in urethrography, although approved by eminent authorities, seems illogical and perhaps dangerous. Oil embolism is always a possibility, and as oil and water (urine) do not mix the delineation of the urethra might be presumed to be more clearly cut with a solution of sodium iodide in water, and such has been the reviewer's experiences.

The surgery of injuries and malformations is dealt with rather extensively and in accordance with modern practice.

There is a brief bibliography at the end of each chapter. The book is a good one but it contains nothing essentially new, and one wonders whether it might not be advantageous to purchase for twice its price a complete modern textbook of urology which would contain all that this does.

**Biological Aspects of Infectious Disease.** F. M. Burnet. 310 pp., illust. \$4.50. Macmillan, Toronto, 1940.

The title of this book combines with the very just observation in the preface, to the effect that most biologists know little bacteriology and most bacteriologists are concerned with the medical rather than the biological aspects of their subject, to arouse expectations in the biological reader which he may not find fulfilled. Bacteriology has undoubtedly many contributions to make to general biological theory, and even if data are scanty there are many questions which the biologist would like to see discussed; the effect of recent virus studies on the definition of the word "life", the part played by micro-organisms in directing the evolution of higher forms, the relation between bacterial variation and genetic mutation, the bacteriologist's outlook on human history (so ably sketched by Zinsser for the Rickettsiae), to name only a few. But Dr. Burnet has been content with a more modest objective, which he has completely and delightfully attained; namely, to write a broad general account of the principal infectious diseases, their epidemiology, their causative organisms, and the body's defences against them, without the stiff angularities and detail of a textbook, and, mercifully, with no trace of the heroics which inflate so many introductions to this subject. One would recommend his book enthusiastically as collateral or preparatory reading for the medical student, whose formal course in bacteriology is all too brief and crowded, or for the student in biology who has not yet decided where to specialize. It is so clearly and pleasantly written that the medical man and the pro-

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fessional biologist should thoroughly enjoy it; but the former need not expect to find hints useful to him in his practice, while the latter may be irked by the absence of references to more detailed studies. One may quarrel with the author's stand on some controversial questions (for instance, the rôle of re-infection in tuberculosis) and blame him for sidling rather awkwardly past the problem of the venereal diseases, but in general his work is balanced, authoritative, up-to-date and rich in ideas, as well as being very readable. The medical sciences have not fared as well as physics and "pure" biology at the hands of their interpreters to the intelligent lay public, which is an added reason for hoping that Dr. Burnet will find an extensive audience.

**Mechanisms of Biological Oxidations.** D. E. Green.  
181 pp. \$3.75. Macmillan, Toronto, 1940.

The last decade has seen bewildering advances in our knowledge of the essential mechanisms whereby the molecules of the food-stuffs are oxidized and forced to yield their contained energy in living tissues. These mechanisms have proved very complex. We know, for instance, that the first stage in the oxidation of lactic acid in muscle is the loss of two hydrogen atoms with the formation of pyruvic acid; that the hydrogens are transferred by the appropriate specific enzyme to the pyridine-adenine-dinucleotide cozymase; thence to the flavin-adenine-dinucleotide of the enzyme diaphorase; then they are oxidized by the iron of the pigment cytochrome, which in turn is re-oxidized by its specific oxidase; the final outcome being pyruvic acid and hydrogen peroxide, which last is broken down by the haemoglobin-like enzymes catalase and peroxidase to water and oxygen, while the pyruvic acid is further attacked by yet another enzyme in association with cocarboxylase. These discoveries have gained in dramatic interest from their relation to vitamin research. Cozymase contains the pellagra-preventing nicotinic acid, diaphorase contains riboflavin (vitamin G), cocarboxylase is a compound of thiamine (vitamin B<sub>1</sub>), and so on. The fundamental importance of these accessory food factors is thereby made clear, even if the immediate cause of the deficiency symptoms is not always obvious.

In the book under review Green has written a singularly clear and straightforward account of our knowledge of these various oxidizing enzymes and coenzymes, their properties, occurrence, composition, and mode of action. Within this field he has done admirably (though advancing knowledge may soon render even this up-to-date summary old-fashioned); outside this field, he has hardly stepped at all. He does not discuss intermediary metabolism nor the schemes by which lactic acid, pyruvic acid, and the other substrates for his enzymes and coenzymes are supposed to arise from the constituents of the food, nor the quantitative importance of the various chemical reactions in the energetic economy of the body. It is interesting to see that this book hardly overlaps at all the ground covered in Dakin's well-known monograph, "Oxidations and Reductions in the Animal Body" (1922), which was principally devoted to schemes of the metabolic pathways, derived from studies of the fate of substances not completely destroyed in the body; almost nothing was known of the enzymes involved at that time.

The present work is suitable, then, only for relatively advanced students and others immediately concerned with the oxidizing enzymes and coenzymes; to these, it may be unreservedly recommended as a clear, well-balanced picture of a confusing and complex subject.

## BOOKS RECEIVED

**Hearing and Equilibrium.** H. Maenaughton-Jones.  
128 pp., illust. \$2.25. Macmillan, Toronto, 1940.

**International Clinics.** Edited by G. M. Piersol. Vol. 4, N.S. 3. 326 pp., illust. \$3.00. J. B. Lippincott, Montreal, 1940.

**Textbook of Gynaecology.** S. Forsdike. 290 pp., illust. \$2.25. Wm. Heinemann, London, 1940.

**Standard Radiographic Positions.** N. Davies and U. Isenburg. 136 pp. \$1.75. Macmillan, Toronto, 1940.

**The Universe Through Medicine.** J. E. R. McDonagh.  
389 pp. \$7.50. Macmillan, Toronto, 1940.

**Year Book of Pathology and Immunology.** Edited by H. T. Karsner and S. B. Hooker. 688 pp., illust. Year Book Publishers, Chicago, 1940.

**Year Book of Industrial and Orthopedic Surgery.** Edited by C. F. Painter. 484 pp. Year Book Publishers, Chicago, 1940.

**Tuberculinothérapie dans les Nevralgies Faciales Idiopathiques et Certaines Affections Essentielles.** C. Charlin. 336 pp., Nascimento, Santiago, 1940.

**Acidos Aminados Fisiología Patología, Terapéutica.** Pedro M. Re. 1065 pp. Librería Y Editorial "El Ateneo", Buenos Aires, 1940.

**Hydrocephalus.** O. Marburg. 217 pp., illust. \$3.00. Oskar Piest, New York, 1940.

**Treatment of War Wounds and Fractures.** J. Trueta. 146 pp., illust. 8s. 6d. Hamish Hamilton Medical Books, London, 1939.

**Functional Diseases of the Intestines.** G. Singer. 80 pp., illust. \$2.50. McAinch, Toronto, 1940.

**Displacement Method of Sinus Diagnosis and Treatment.** A. W. Proetz. 2nd ed., 296 pp., illust. \$6.00. Annals Publishing Co., St. Louis, 1940.

**Obesity and Leanness.** H. R. Rony. 300 pp., illust. \$4.25. Macmillan, Toronto, 1940.



